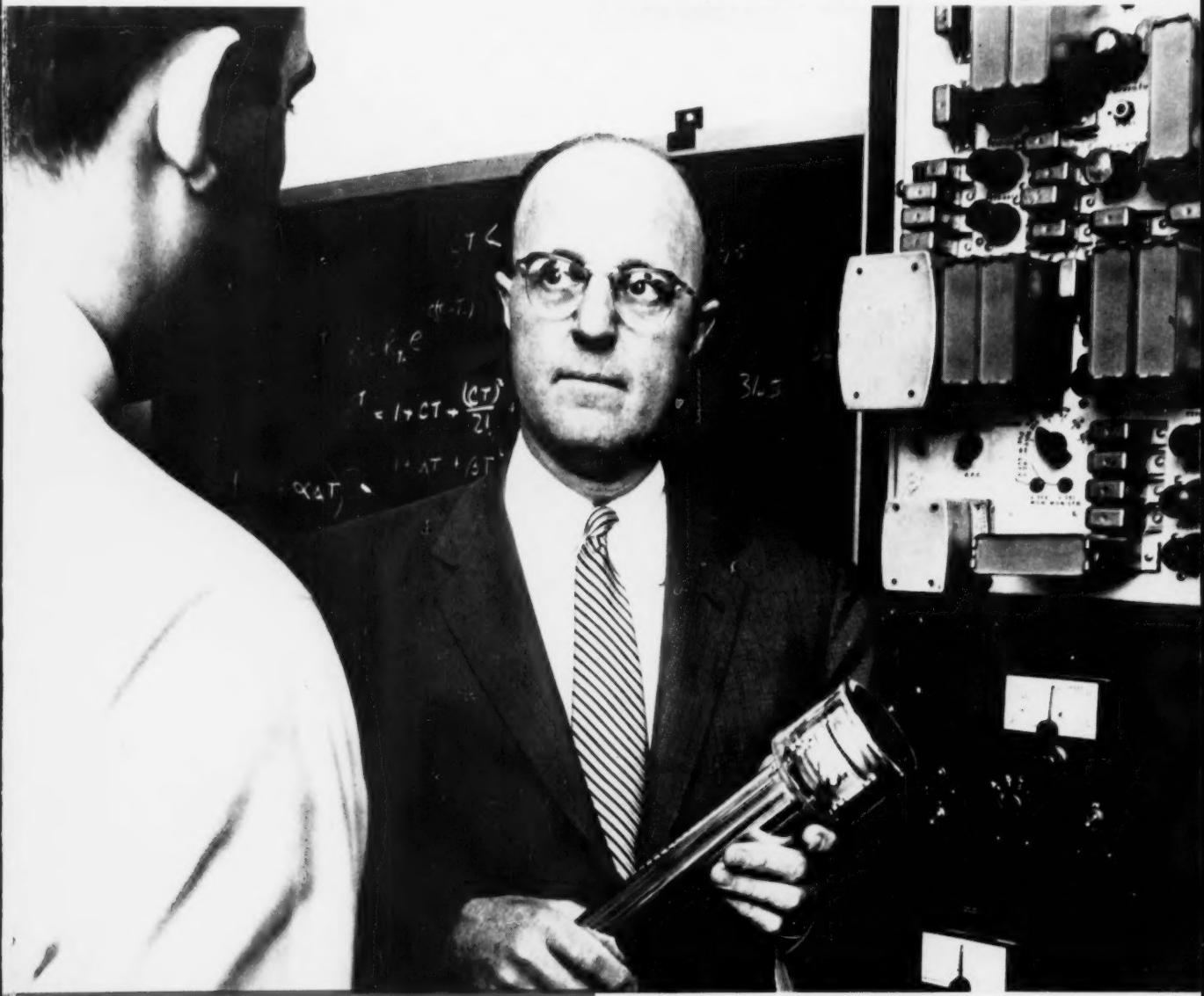


IRON AGE

The

March 7, 1957

The National Metalworking Weekly



GE's Guy Suits

How Small Firms
Can Profit
By Research P. 83

New Test Checks
Electroplating Porosity - P.123

How To Rate
Employee Suggestions - P. 88

Digest of the Week P. 2-3

Read how to increase Cupola efficiency!

If you want to save money you'll want to read "Fundamental Considerations For Cupola Operation." This 8-page, service-type bulletin — just off the press — is loaded with practical information. It discusses factors of cupola operation that affect the combustion and melting conditions. Emphasis is placed on the importance of coke quality, material size, stock distribution and "hang-ups."

The author also describes accessory equipment that aids operators in obtaining greater uniformity when even the best materials available and the best operating practice do not produce results that meet a customer's requirements. Write today for this important booklet. Request Bulletin No. FO-11.

Fundamental Considerations
for Cupola Operation



WHITING CORPORATION
15601 Lathrop Avenue, Harvey, Illinois

Send for any or all of these other "service-type" bulletins: "How To Make Your Cupola Operation More Efficient", FO-1 . . . "Tips On Improving Cupola Charging", FO-2 . . . "Hot Blast", FO-3 . . . "Facts On Duplexing", FO-4 . . . "Here's How To Save Melting Fuel", FO-5 . . . "The Electric Furnace In The Iron Foundry", FO-6 . . . "Cupola Blast Control", FO-7 . . . "Suggestions For Solving Some Cupola Operation Problems", FO-8 . . . "Review of Foundry-Cupola Gasses and Temperatures", FO-9 . . . "Whiting Hydro-Arc Furnace Control", FO-10. Please order by "FO" number!



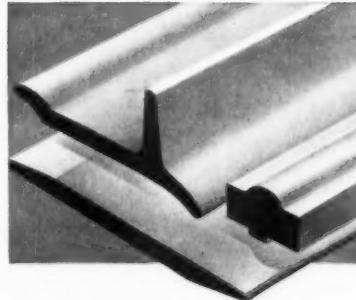


Another job for special sections

This heavy construction team consists of a D7 tractor and No. 70 scraper, both manufactured by Caterpillar Tractor Co. Though not evident to the eye, Bethlehem special sections are also a part of this team, proving once again their value in a thousand and one applications.

Take those deep-biting grouser shoes on the tractor. We roll them to Caterpillar's designs and specifications, with the customer's name rolled right into the steel.

The power of the D7 tractor's diesel engine is delivered through a heavy-duty universal joint that is supplied by the Mechanics Universal Joint Division of Borg-Warner Corporation. This joint, in turn, is equipped with trunnion bearings made from Bethlehem special sec-



tions. Hot-rolled to the required dimensions, and supplied in barlengths, the sections are finish-machined economically on the customer's multiple-spindle bar automatics.

Finally, the scraper blade itself is a special section. Rolling in the bevels is by far the most economical way to produce these blades.

Other heavy equipment parts frequently made from special sections are structural framing members, push arms and parts for various engine and drive assemblies.

But there's no end to the versatility of Bethlehem special sections. They're used in typewriters, pianos and lawn mowers; in railroad cars, steel grating and automobile hinges. How about your products—could you make them better, faster, more economically with hot-rolled special sections? We'd like to talk it over with you. Just call or write the Bethlehem district sales office nearest you.

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The IRON AGE

Digest of the Week in

*Starred items are digested at right

EDITORIAL

Security Anonymous an Approach
to "Gimmies"

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NEWS DEVELOPMENTS

WIRE MARKET BAROMETER IS ON THE RISE

This indicator of steel market trends shows new strength. Consumer inventory control cutbacks



are about finished. Users indicate that uptrend in ordering is due to start in the second quarter. **P. 86**

AWARD EMPLOYEE IDEAS WHAT THEY'RE WORTH

In any company suggestion program it's not easy to evaluate intangible ideas. Safety values, for instance, are elusive until a life is saved. Several companies have devised point systems which merit consideration. **P. 88**

WATCH OUT FOR HIDDEN LABOR COSTS

Not even the fine print of your labor contract shows all the labor costs. Here are some pointers on how to avoid hidden costs that can creep into the best negotiated contract. **P. 89**

FREIGHT CAR BUILDERS CUT BACKLOGS

The easing plate market, larger mill allotments, and shrewd steel

Metalworking



trading are helping car builders reduce back orders. **P. 90**

HOT ALUMINUM SALES ARE HEADING UP

When you hear of a new aluminum plant, look for a hot metal consumer to build next door. It has happened to Reynolds three times. Company says there are big advantages. **P. 91**

FEATURE ARTICLES

CHECK PLATING POROSITY WITH NEW TEST

New radiographic methods developed by National Bureau of Standards permit nondestructive checking of adherent plated coatings for porosity, pits, other discontinuities. Methods reveal discontinuities as small as 0.001-0.002 in. diam. Either of two radiation sources can be used. **P. 123**

CONTINUOUS FEED WELDING CUTS COSTS

Something new in production welding: A process which continuously feeds wire electrode that is magnetically coated with flux and shielded in a gas atmosphere. Already in use on steel, the process can be used in all positions at higher speeds than covered electrodes. Air-cooled torch cuts costs. **P. 127**

CENTRALIZED SETUP SPEEDS O. H. DOOR RELINING

Feeding all openhearth furnace doors into one central relining station is paying off for Gary Works. Lining life is up by average 35 pct

overall since program began. Net effect: higher production **P. 130**

LET MAGNETS CLEAN UP MILL COOLANTS

Major steel mills are finding magnetic separators effective in removing contaminants from cold-rolling-mill coolants. Times between coolant tank cleanouts have been prolonged from weekly schedules to four-month intervals in some instances. **P. 132**

HOW MUCH DO FLUIDS AFFECT GRINDING?

Not merely the fluids used, but the way they're applied, affect grinding performance. Here are test findings on how mist applications checked out. **P. 134**

MARKETS AND PRICES

AUTOS HEADED FOR RADICAL DESIGN CHANGES

In 10 years the average new car will be 52 in. high, several inches lower than most cars today. Engineers must design such things as butterfly doors and sliding roofs to go with them. **P. 100**

NEXT WEEK

METALWORKING'S STAKE IN ATOMIC ENERGY

Don't overlook opportunities in this growing market just because your company is not interested in atomic energy as such. Field is growing for "hardware"—the non-

PAYOUT: Your investment in research will pay bigger dividends if you plan ahead. This is a must for the small company. GE's Guy Suits has other valuable pointers for the research-conscious. **P. 83**

AIR FORCE HOPES CONGRESS WILL BOOST FUNDS

Congress has record of helping out Air Force budget. Generals are lobbying for an increase for next fiscal year. Boost may be several hundred million dollars, could approach a billion. **P. 105**

MORE PIG IRON CAPACITY ON WEST COAST?

Farwestern steelmen, viewing area's growth, are considering enlarging their hot metal output. In this article Columbia-Geneva's President Leslie Worthington reviews the pros and cons of the idea. **P. 107**

STEEL MILLS RESORT TO THE HARD SELL

Easier demand for some steel products is tightening competition. Mills are using every tool at their command to bolster sales. Some tight products are being used as bait to develop sales of easier-to-get items. Situation makes going tougher for mills not in position to make plate, structurals, and pipe. **P. 175**



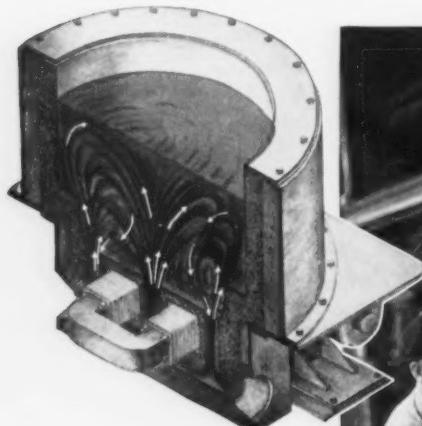
nuclear end of the business. It may pay to study this market closely.

Hard-To-Melt Bronzes Successfully Handled

In

AJAX INDUCTION FURNACES

Brass and bronze foundries all over the country have found **AJAX-TAMA-WYATT** induction furnaces a reliable tool for melting silicon bronzes, aluminum bronzes, leaded bronzes, phosphor bronzes, and other high strength alloys. Operation is highly economical due to the good uniformity of the alloys, low ratio of rejects, drastic reduction of metal losses, and clean operating conditions. This recent development opens the field for the use of **AJAX** induction furnaces in all foundries where difficult-to-melt alloys are handled.



Cross section of **AJAX-TAMA-WYATT** twin coil induction furnace such as used at the Torrance Brass Foundry. Heat is produced within the molten metal in the secondary channels and conveyed throughout the melt by electromagnetic circulation, resulting in minimum metal losses and high uniformity of alloy. Temperature is automatically controlled.



(Photograph courtesy of Long Beach Press-Telegram, Long Beach, Cal.)

The furnace pictured here is melting aluminum bronze at the Torrance Brass Foundry, Torrance, Cal., operating at a temperature of 2400 F, for the production of high strength centrifugal castings.

This unit is rated 100 kw. Note also the clean, smokeless operation as shown in the unretouched photograph.



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Security Anonymous

An Approach to "Gimmees"

In highfalutin' language it is said that the whiskey bottle is often a substitute for "mother". It soothes the aches and pains of growing up—and keeps us in the throes of pseudo-childhood.

Then we have direct cases where the bottle is not substituted. The person is still tied to the apron-strings. It isn't known who is at fault—the mother or the "child".

Another substitute for adequately facing life is excessive eating. We know that eating our way through our troubles is not uncommon.

But we have powerful forces working against these temporary—we hope—returns to childhood. Alcoholics Anonymous is doing the best job in history for its believers. Where other means fail it helps.

A sense of well-being causes most of us to watch our belt line; if not for looks, then for health's sake. The pride of achievement—loss of weight—keeps many on the right track.

These are but a few of the things we struggle with. But the returns on objective self-analysis are not small. This is true in our relations with our families and our employees.

Blunt—and at times disagreeable—psychia-

trists tell us we often substitute another compulsion for one we have licked. This may be the case in the excessive drive for security which we see on all sides today.

The Government's budget for fiscal 1958 is an example of nationwide compulsion. Everything that we could possibly want from "mother" is in it. The drive for the millennium is really there in force.

We want modern schools for everyone. We want medicine and help for all. Roads right now. Bigger and better welfare programs. Freedom from worry, work and want is our goal. All are good goals but they are still goals.

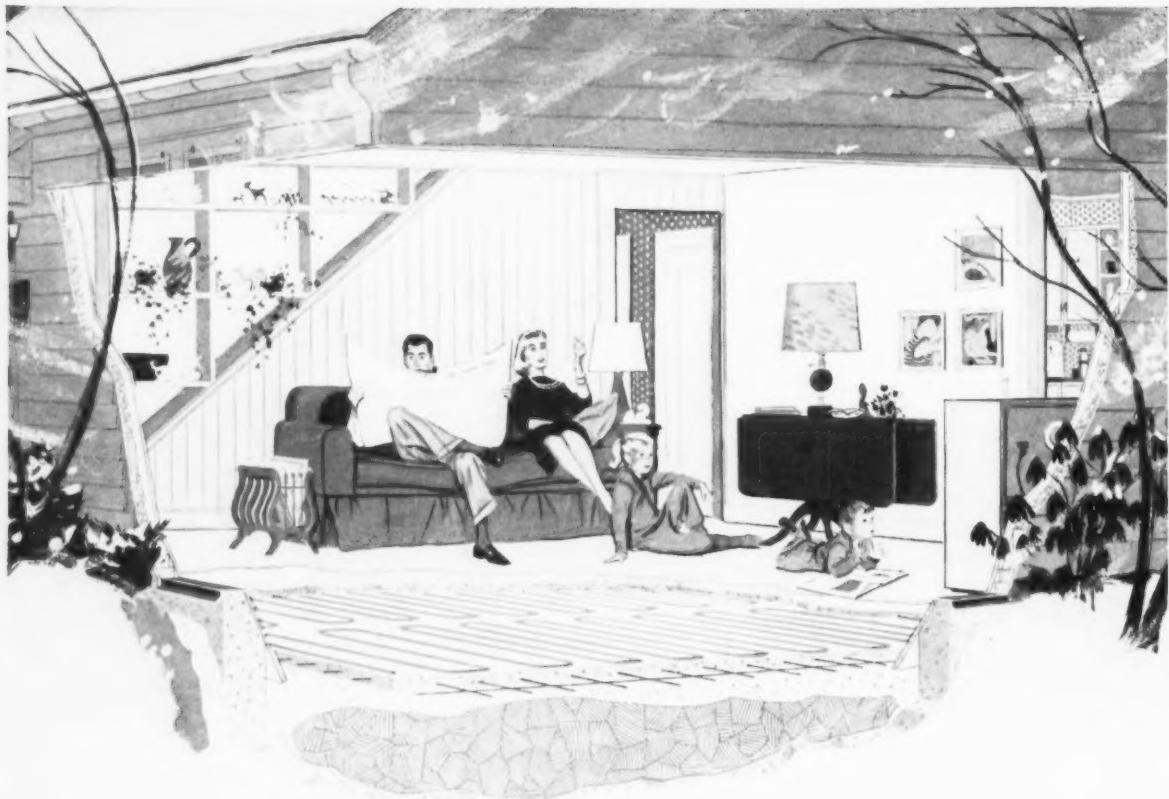
In our national effort to have Mother Government give us what we want we may be substituting a new compulsion that eventually will rock us right out of our "cradle".

We need a new movement. We must relieve our government as soon as possible from doing what we can do for ourselves. Call it "Security Anonymous". Do it quietly and effectively in business, at home and at play.

With government doing less for us perhaps we may do more for ourselves!



Editor-in-Chief



The floor is pleasantly warm to the touch as it radiates heat, like a fire in a fireplace!

Instead of warming the air around you...

COPPER warms you!

With radiant heating in your home, heat rays are absorbed directly by persons in the room. They pass *through* the air. How is it done?

Copper coils are embedded in floors or ceilings to form "panels". Through this copper piping flows hot water. The radiant panels deliver their heat by direct rays.

The air might actually stay quite cool. Yet *you* feel comfortably warm!

AND WHY COPPER?

Copper tubing comes in long lengths, (that means fewer joints . . . and tighter, too!) It is light

in weight. Being flexible, it can easily be bent.

Needed is copper's age-old durability . . . and copper's freedom from scale and clogging up.

Today, copper is standard for carrying water . . . hot or cold, in domestic and commercial use. It is the recommended metal from water main to faucets, (and for the faucets themselves!) When it comes to radiant heating, copper comes first!

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LETTERS FROM READERS

Sleeping Habits

Sir:

How can you know so much about the business man's sleeping habits as given in your excellent Feb. 21 editorial "Be-Kind-To-Businessmen Week"?

But you sure do, and your editorial is a honey!

Give us more and more of these, and paste them on high so everyone can see them, just as I've tacked mine up for all to peruse.

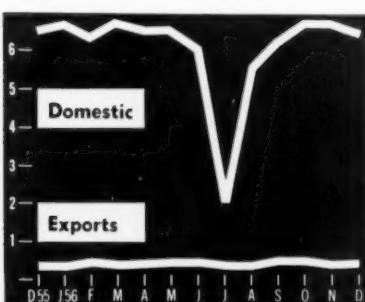
Good luck and good hunting.
E. L. Solomon, Max Solomon Co., Pittsburgh, Pa.

Old Adage

Sir:

The graph shown on p. 66 of the Feb. 7 issue of THE IRON AGE is a good illustration of the old adage that "Figures don't lie, but liars figure."

Millions of Gross Tons



The graph shows scrap consumption of $6\frac{1}{2}$ million tons per month and exports a little less than $\frac{1}{2}$ million tons monthly.

Export scrap is all "foreign" scrap to the mills. What the figure conceals is how much of steelmaking scrap is "home" scrap-produced in the steel plant operations.

It continues to circulate less losses.

The important figure is the total "foreign" scrap against exports. In-

stead of the ratio being 1-13, it would show up about as 1-6 or 1-7, a much more important relationship. **C. W. Holmquist, Executive Vice Pres., Copperweld Steel Co., Steel Div., Warren, Ohio.**

Hungarian Metallurgist Seeks Help

Sir:

As an escaped Hungarian metallurgical engineer in Austria I would like to ask your assistance in my emigration to the United States. I obtained my metallurgical engineering diploma four years ago, and since that time I had been working in the main foundry of the Danubian Iron Works as a smelting specialist.

THE IRON AGE is a well-known professional periodical among Hungarian metallurgists and I hope that you will help me find employment with a smelting concern.

Unfortunately, I cannot speak the English language as yet, but it goes without saying that I should be more than glad to perform any kind of work until such time as my command of the language enables me to resume professional activity.

My personal data: I was born in Gyor, Hungary, on August 28, 1930. After graduation from the classical gymnasium, I studied at the Engineering College of Sopron, Hungary, where I obtained my diploma in metallurgical engineering. I am married but have no children. Besides Hungarian, I speak some German. Because of my opposition to the prevailing political system, I was forced to leave Hungary during the 1956 revolution. **Selmechi Erno, bei Nadica Schlaffer, Eichgraben N.O., Ottenheim 5, Austria.**

We are happy to publish your letter in the hope that some of our readers can help.—Ed.



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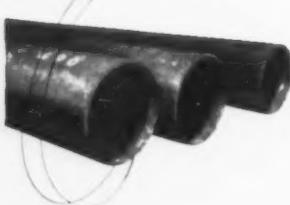


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To keep your interest and give you something worthwhile for the time you spend with us we must communicate faster. This is a one-word way of saying we must do everything we can to get ideas off the page fast and into your mind.

New Format—Publishing is like any other business: the product must constantly be reviewed to see where it can be improved. The editors will remind you that they have been doing this for many years—that last week's IRON AGE was a whale of a lot easier to read than one of a few years back.

As graphic art skill grows and research becomes more reliable we find new ways to make your favorite family journal more useful. We believe you'll find this week's issue even easier to read than last week's; it has been redesigned from cover to cover. It communicates faster.

The President's Choice—Most important in making THE IRON AGE easier to read are new and larger type faces for headlines and body copy. The body copy is now set in Times Roman. "The masculine simplicity and directness of Times Roman letter structure is apparent at a glance," says Mergenthaler, the firm which makes Times Roman and a host of other type faces. A few years ago, when Doubleday & Co. were publishing President Eisenhower's "Crusade in Europe," sample pages in various type styles were submitted to him. He immediately picked the one set

in Times Roman; said he liked it because it had authority.

Six months work has gone into the new design of this issue. Pages where the change is quite obvious include: the Editorial (p. 7), Newsfront (p. 81); the news section itself (p. 83) and the News Analysis columns: Automotive, Washington, Machine Tools, West Coast.

There's a new treatment and a new location for THE IRON AGE Salutes (p. 97); a new layout for Men in Metalworking (p. 113). We're giving you another column of exhibits and meetings (p. 13), with more emphasis on exhibits. And we think the "Digest of the Week" (pp. 2-3) should be easier to read.

But the final answer will have to come from you, the reader. The editors would appreciate your reactions: What do you like, dislike, and where can things be improved?

New Puzzler

Eustace Stewart has four friends whose occupations are butcher, baker, tailor and carpenter and whose names are Mr. Butcher, Mr. Baker, Mr. Tailor and Mr. Carpenter. Each has a son and daughter but no son practices the same trade as his father. None of the eight males practices a trade of his name. Each son marries one of the daughters, whose maiden name does not suggest his own or his father's trade. Each girl changed her initial when she married. Mr. Butcher, Sr., is not a baker. The trade of Mr. Carpenter, Sr., is the same as young Mrs. Butcher's maiden name. The baker's son married Miss Butcher. Mr. Stewart would like to know the trade of fathers and sons and the maiden names of the sons' wives.

We have been criticized in the past for running too-easy puzzles. What is your reaction—do you want tougher puzzles?

NEW PLANT FLEXIBILITY



- moves *Inland Steel Products* into special production 4-times faster
- helps cut direct-labor costs 20% for *The Colorado Fuel & Iron Corp.*
- no lost production time in moving *Wyman-Gordon* machine shop
- cuts machine installation cost 90% for *American Type Founders*

Barry Leveling Machinery Mounts let you move machines wherever they are needed, and have them delivering full output in minutes—with no delays for drilling, lagging, or shimming.

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FAST AND EFFICIENT MATERIALS HANDLING Loaded coal car rolls down the incline on the left at about 15 miles per hour. Its speed is reduced automatically in car retarder (A) so that it rolls up a "kick back" at just the right speed to send it back to retarder (B) where it is stopped automatically. A "barney" then pushes the car up the slope to the car dumper (C) where coal is unloaded directly into the ship. The next full car pushes the empty car off the dumper. It rolls down through retarder (D) to the proper track. All this is done by push-button control.



Automation with UNION CAR RETARDERS cuts costs on coal-loading dock

Forty carloads of coal an hour can be loaded on shipboard with this coal-handling system at a Lake Erie coal dock at Conneaut, Ohio.

This job formerly required a crew of men riding the cars and working the hand brakes—a hazardous occupation. Insurance rates were high and frequently men had to wait for the next ship to be loaded.

Now the work is handled quickly

and safely by a push-button system using UNION Electro-Pneumatic Car Retarders. Costs have been greatly reduced and hazards eliminated.

If you have a materials-handling situation involving many carloads of coal, ore or other products, let us show you what can be done with automatic car-retarder systems to increase efficiency and reduce costs. Write for complete information.



UNION SWITCH & SIGNAL

DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY

NEW YORK

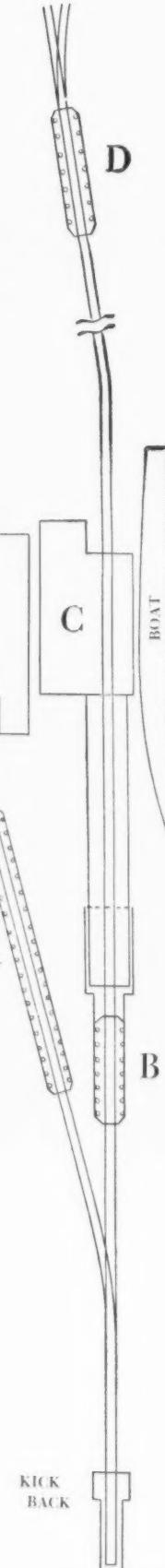
CHICAGO

PITTSBURGH

SWISSVALE, PENNSYLVANIA

ST. LOUIS

SAN FRANCISCO



EXHIBITS, MEETINGS

Western Metal Show—March 25-29, Los Angeles. (American Society for Metals, 7301 Euclid Avenue, Cleveland 3).

Welding Show—Apr. 8-12, Philadelphia. (American Welding Society, 33 W. 39th St., N. Y.).

Engineered Castings Show—May 6-10, Cincinnati. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.).

Design Engineering Show—May 20-23, New York. (Clapp & Poliak, 341 Madison Ave., N. Y. 17).

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22).

Metal Show—Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3).

MARCH

National Assn. of Waste Material Dealers—Annual convention, March 10-13, Hotel Conrad Hilton, Chicago. Society headquarters, 271 Madison Ave., New York.

Steel Founders' Society of America—Annual meeting, March 18-19, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

American Institute of Mining, Metallurgical and Petroleum Engineers, Inc.—Regional meeting, March 18-19, Rackham Bldg., Detroit. Society headquarters, 29 W. 39th St., New York.

American Society of Mechanical Engineers—Second national conference of the Gas Turbine Power

Continued on P. 16

WILLIAMS

TOOLS OF INDUSTRY

Since 1882, Williams has anticipated the tool requirements of manufacturers with a complete line of holders for turning, boring, threading, knurling, planing, shaping, cutting-off and side work. A full line of high speed and carbide cutters and set-up accessories is also available.

You get quickest delivery at lowest cost from your
LOCAL DISTRIBUTOR.

Williams makes the broadest line of its kind. Write for Catalog 302.

J. H. WILLIAMS & CO.

431 VULCAN STREET, BUFFALO, N.Y.

BUFFALO • NEW YORK • CHICAGO • LOS ANGELES

LeBlond customers report:

New REGAL lathe design

Recommended by machine shop operators

P.S.

more for my money,
I also have another
one on order.

Best tool Room lathe I have
within the past 14 years, also

Best Lathe for the money.

it is the best
lathe I have found in
35 yrs. experience

I liked the looks and
the Rigidity.



EBLOND REGAL



scores high with operators

"Satisfied" or "well pleased" report 95% of new Regal operators! Source of these figures is the LeBlond Use-Check Questionnaire, which we send to all new LeBlond lathe owners—a direct method of learning what industry wants, needs, likes (or dislikes) in its lathes. Actually, the new Regal Lathe is designed largely around suggestions and ideas expressed by our customers in Use-Check Questionnaires of recent years.

What do the owners say about the new Regal?

Best-liked Regal features proved to be hardened bedways, electric brake and the speed range. 73% of the new Regals are being used in the toolroom or on the production line. Here's how some of the other questions and answers ran:

- Q. "Is production rate what you expected?"*
A. "Satisfactory or better" (96%).
- Q. "accuracy?"*
A. "Satisfactory or better" (97%).
- Q. "finish?"*
A. "Satisfactory or better" (96%).
- Q. "convenience?"*
A. "Satisfactory or better" (93%).
- Q. "Why did you select a LeBlond?"*
A. "Best dollar value." "Previous experience" (two biggest reasons).

At left are some of our customers' comments in their own handwriting.

The reason for this overwhelming acceptance of the new LeBlond Regal can be summed up very simply. It is what industry has been asking for—performance-wise, feature-wise, price-wise. Your LeBlond Distributor will give you all the details. Call him today, or write.

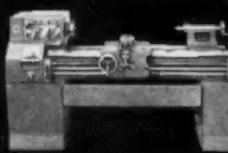
... cut with confidence



THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

Designed and built like heavy-duty lathes, the new LeBlond Regals will give you a long life of precision production, minimum maintenance and the kind of dependability you'd expect from a much higher-priced machine!

The new Regal headstock uses the same combination gear-belt drive construction that proved itself on the famous LeBlond Dual-Drive and is now incorporated on our new 16" heavy-duty lathe. The new bed has hardened and

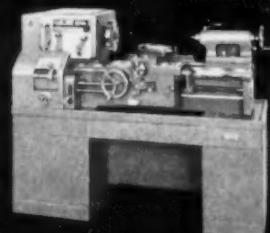


13" and 15" Regals

ground replaceable steel ways like the ways on our heavy-duty machines. They are fitted according to the compensating veeway principle to insure better distribution of forces for proven long-time accuracy and minimum wear.

Again, like higher-priced lathes, Regals are equipped with both feed rod and lead screw for continued accuracy in thread chasing.

Other big-lathe features — 3-bearing spindle. Automatically-lubricated quick-change box. Wide carriage bridge with ample bearing surface.



13" Regal Bench Model

Rugged tailstock with plug clamping. Plus general dimensions and construction details patterned after LeBlond heavy-duty lathes.

All of LeBlond's 70 years of experience has gone into the design and building of these new Regals. Only from the builder of a complete line of lathes can you get a low-priced lathe with big-lathe features.

EXHIBITS, MEETINGS

Continued from P. 13

Div., March 18-21, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 29 W. 39th St., New York.

Society of Automotive Engineers—National production meeting and forum, March 20-22, Hotel Statler, Buffalo, N. Y. Society headquarters, 29 W. 39th St., New York.

American Society of Tool Engineers—Silver anniversary annual meeting, March 23-28, Shamrock Hilton Hotel, Houston, Texas. Society headquarters, 1007 Puritan Ave., Detroit.

Instrument Society of America—Pittsburgh section, annual conference on instrumentation for the iron and steel industry, March 26-27, Hotel Roosevelt, Pittsburgh. Society headquarters, 845 Ridge Ave., Pittsburgh.

ASME-AIEE—Fifth annual engineering management conference, March 27-28, Penn-Sheraton Hotel, Pittsburgh. Society headquarters, 29 W. 39th St., New York.

APRIL

American Hot Dip Galvanizers Assn.—Annual meeting, Apr. 2-3, The Empress Hotel, Miami Beach, Fla. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

National Screw Machine Products Assn.—Annual spring meeting, Apr. 7-11, Shoreham Hotel, Washington, D. C. Society headquarters, 2860 E. 130th St., Cleveland.

Malleable Founders' Society—Market development conference, Apr. 10-11, Edgewater Beach Hotel, Chicago. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

With our battery of large electric furnaces and our large modern well equipped molding department, castings of this size are quite common in our production schedule.

Yet, if you require it, we can produce castings as light as only a few ounces. In fact, with our shell molding department we can produce in quantity very small pieces of any high alloy analysis desired.

Experience? Well, our work with static high alloy castings goes back to 1922 and with centrifugal castings back to 1931. This long experience is your assurance of a sound casting correctly alloyed.

THE DURALOY COMPANY

OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 332 South Michigan Avenue

Beauty

for the life of the car

1957

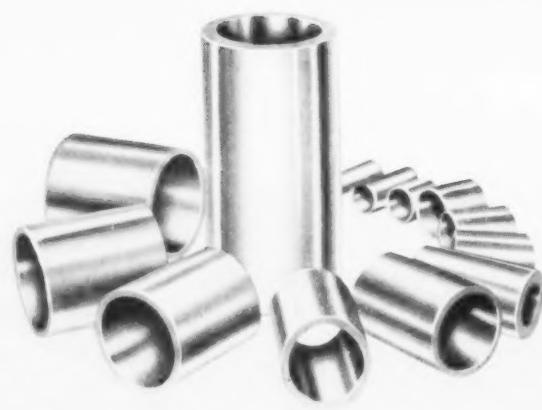
Automobile trim of
**Superior
Stainless** STRIP STEEL

You can't tell the age of a car by its stainless steel! After a thousand or two hundred thousand miles of driving, Superior Stainless gleams good as new. • Enjoy the beauty of stainless on the cars you buy — costs you nothing in care, gives you everything in pride and pleasure!

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA



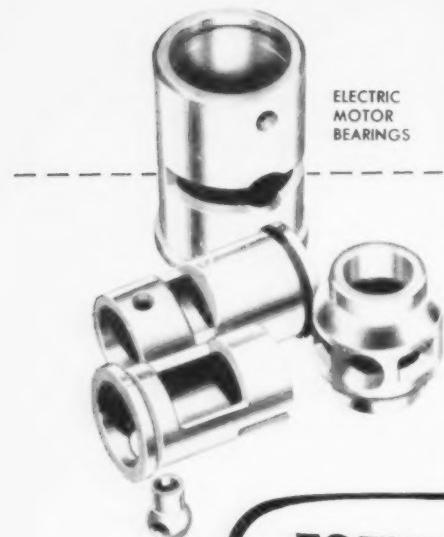
GRAPHITED
BRONZE



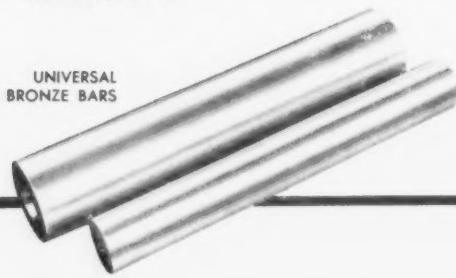
GENERAL PURPOSE



LEDALOYL
SELF-LUBRICATING



ELECTRIC
MOTOR
BEARINGS



UNIVERSAL
BRONZE BARS

**Over 2300
types and sizes
of bearings and
bars in stock**

Johnson Bronze can supply over 1900 sizes and types of sleeve bearings, and over 400 sizes of bronze bars from stock. This includes standard stock GP bearings, graphited bearings, Ledaloy self-lubricating bearings, and electric motor bearings made to motor specifications. You can select an economical standard bearing for almost any application from this large stock. For complete details on how Johnson Bronze stock bearings can save you money, contact your Johnson distributor.

**Johnson
Bronze**

505 South Mill Street • New Castle, Pa.

**JOHNSON
Bearings**



12 Ton Plymouth Locomotive operates 24 hours daily over 10 mile track system at this modern steel mill

PLYMOUTH lowers production costs by keeping steel in process on the move!

You get the reliability that returns greater profits when you put a Plymouth Locomotive to work—and the more continuous usage you give it, the more you benefit. There are many good reasons for that.

Plymouth Locomotives are built to handle big jobs with speed and efficiency around the clock—in all kinds of weather. Instant availability, low maintenance requirements, and faster switching, spotting and hauling performance reduces costs all around. Smooth starts and ease of control make Plymouth popular with the operators, reduce fatigue, and keep efficiency high.

We make both gasoline and Diesel Locomotives from 3 to 80 tons—either mechanical or Torqomotive (hydraulic torque-converter) drive—there's a Plymouth Locomotive that will fit your requirements perfectly.

"Saving time and money with our Torqomotive," says this user.

Within a few months after the Plymouth Diesel Torqomotive shown above was delivered, this Eastern steel manufacturer knew they had an outstanding locomotive. "Too early for actual cost figures," was the report, "but haulage by Plymouth is superior to previous methods. Our operator likes it better, too."

Send us a brief outline of your operation and we'll send you a recommendation promptly. Address: Plymouth Locomotive Works, The Fate-Root-Heath Company, Dept. A-2, Plymouth, Ohio.

PLYMOUTH[®] LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

PLYMOUTH LOCOMOTIVES—
in PROGRESSIVE INDUSTRY
throughout the WORLD

RAIL
POWER

ALSO BUILDERS OF
F-R-H CERAMIC MACHINERY

JUST PUBLISHED!

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New 24-page brochure
gives complete
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Here's the story of **fatigue-proof** steel bars

MADE BY THE **e.t.d.** PROCESS

Elevated Temperature Drawing

*a new material—made by
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**High Strength
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Plus Accuracy, Smooth Finish, and Straightness

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Please send me your new 24-page brochure, "A New Material"

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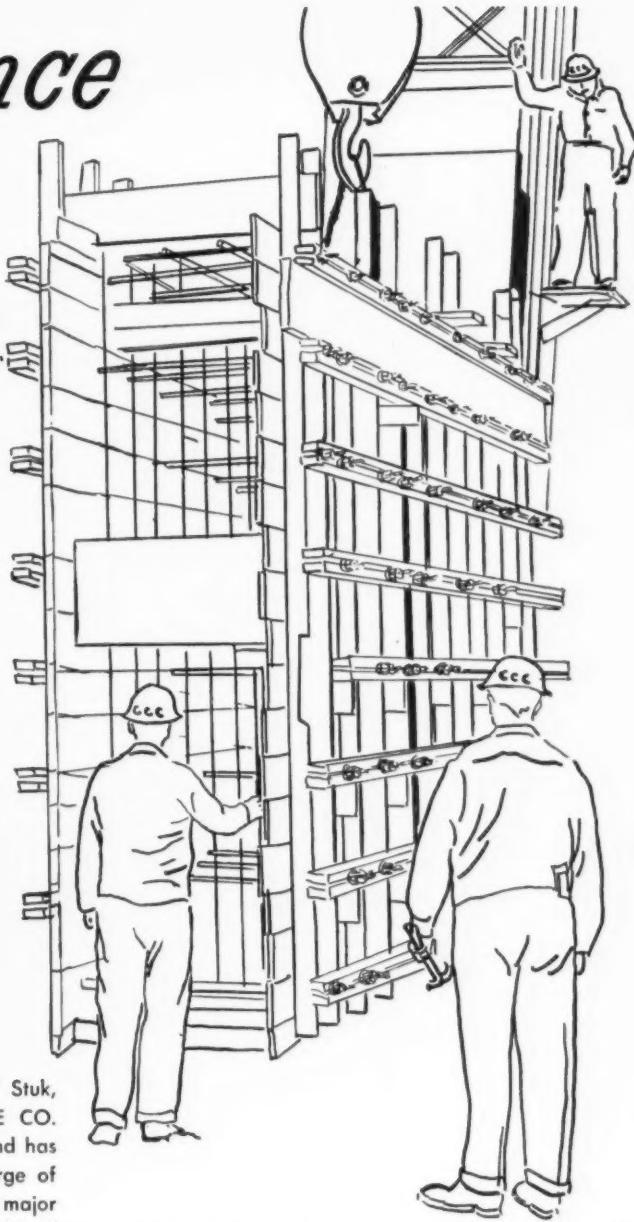
the difference between Champion & Runner-Up



JOSEPH STUK
GENERAL CARPENTER SUP'T.

Take for an instance the case of Joseph "Joe" Stuk, general carpenter supt. for CHICAGO CONCRETE CO. Joe, who has carried a carpenter's card since '28 and has been in a supervisory capacity 18 years, is in charge of prefabricated form work and scaffolding on all major projects wherein particular emphasis has to be placed on exactness and an understanding of what is called for and how best to accomplish that end.

His pet assignment is, working exclusively from prints, to supervise the building of forms and scaffolds by sections away from the construction site while other CHICAGO CONCRETE crews are at work preparing for new construction. Within minutes after the other crews are finished, Joe and his crew are fitting their



pre-fab sections snugly and accurately in position. Savings in time effected through the efforts of Joe Stuk and his pre-fab crew literally run into days—even weeks!

While Joe Stuk is to be commended for his ability and technical ingenuity, it is to be noted that he is typical of the many skilled construction-men who make up the roster at CHICAGO CONCRETE . . . men anxious to tackle the next job that you have that calls for experience, know-how and the desire to get the job done right!

CHICAGO CONCRETE CONSTRUCTION CO.

DIVISION OF CHICAGO CONCRETE BREAKING CO.

12233 S. AVENUE "O" • CHICAGO 33, ILL. • BAyport 1-8400

PITTSBURGH AREA: 213 Corey Ave. • Braddock, Pa. • ELectric 1-1656



The Metal Man Says:

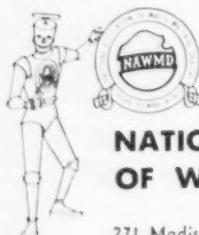
in the Alps it's risky,
but in business it's
good sense to

go to the top!

As a generator or consumer of non-ferrous metal scrap, it will pay you to deal with NAWMD members — top leaders in their field.

Their wide scope of business activity assures you of the maximum possible service — including valuable assistance in setting up the most profitable methods of scrap recovery. NAWMD specifications are the accepted standard throughout the world.

It will pay you — more — to go to the top!



METAL DEALERS DIVISION

"Always look for the sign"

NATIONAL ASSOCIATION
OF WASTE MATERIAL DEALERS

271 Madison Ave.

New York, N.Y.

For counsel on non-ferrous
metal scrap, be sure to consult
a NAWMD member dealer.



POROSITY CAN'T HIDE BEHIND THIS SQUARE CUT

-WHEN YOU DIVIDE YOUR FORGING STOCK WITH A "BUFFALO" BILLET SHEAR

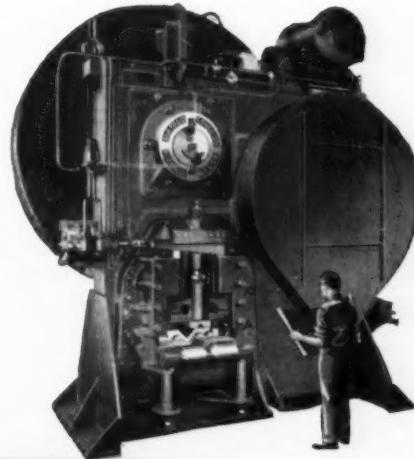
The time to detect porosity or "pipes" in your stock is *before* the forging, not afterwards, and that's one of many ways "Buffalo" Billet Shears save money.

The knives penetrate only $\frac{3}{16}$ ", localizing a sharp, vertical fracture—perfectly square, without the "smearing" present on sawed or burned faces. This enhances visual inspection and prevents many a forging "reject".

Other savings with "Buffalo" Billet Shears are high cutting speeds—elimination of gas and burner expense—maintenance of uniform weight in billets—and minimum operating cost over the years.

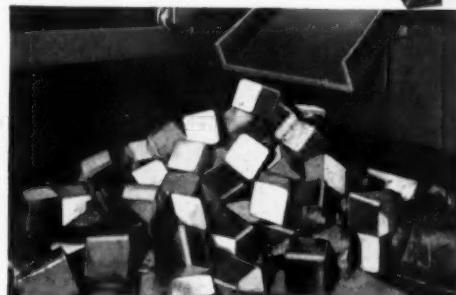
11 sizes are ready to meet your needs, the smallest handling $2\frac{1}{4}$ " rounds or 2" squares at 30 strokes per minute—the largest handling 10" rounds or 9" squares at 6 strokes per minute. All have the "Q" Factor* of engineering and workmanship that provides trouble-free satisfaction and long life in every "Buffalo" product. Write for Bulletin 3295-C and see how these Quality features can save you money.

*The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.



540 PER HOUR!

That's the output of a "Buffalo" No. 15 Billet Shear dividing 7" square stock in a large plant. Machine has automatic feed table and back gage. Above is a No. 17 Shear, largest in the line.

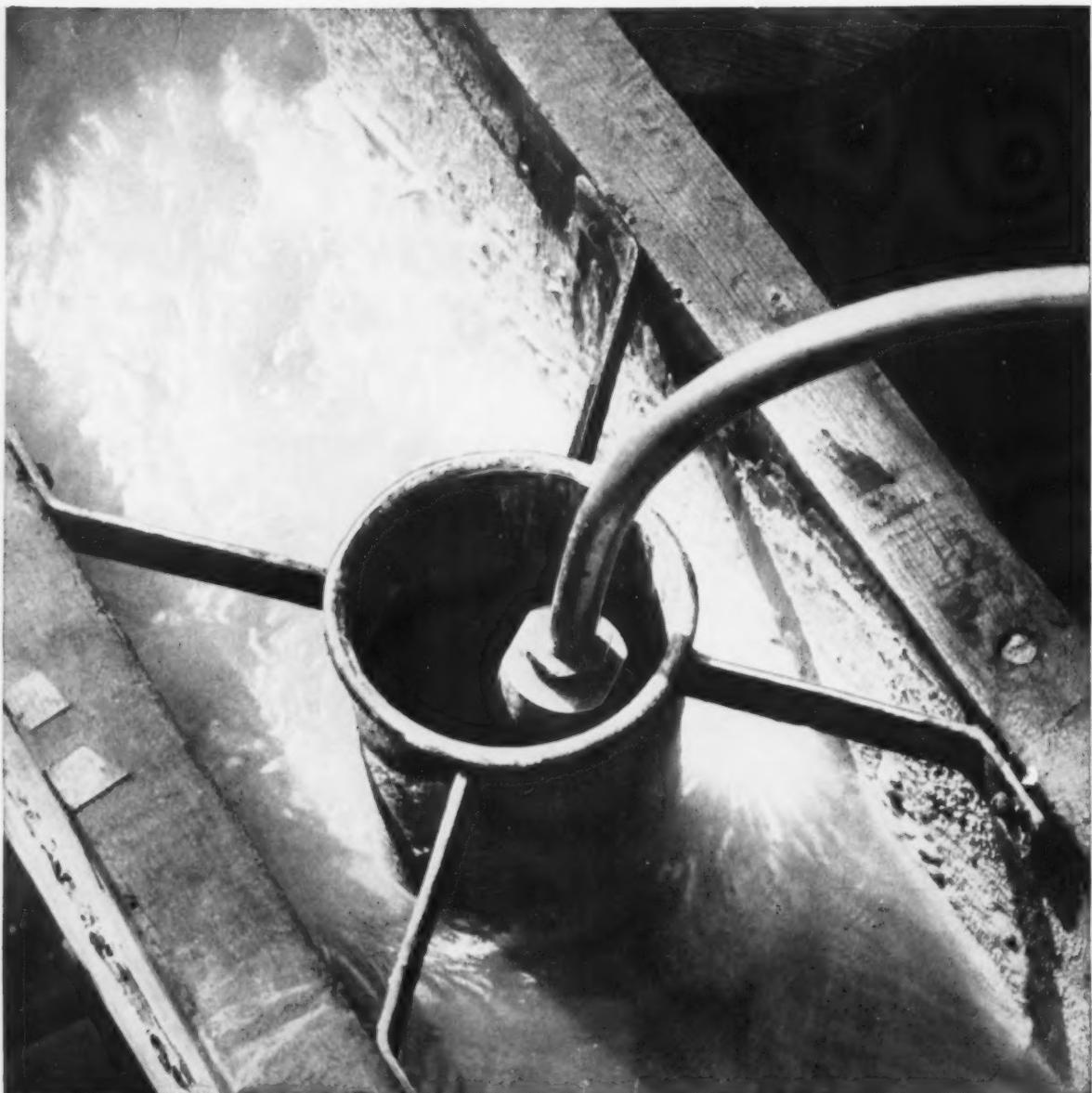


BUFFALO FORGE COMPANY

492 Broadway • Buffalo, N.Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING



This effluent is controlled at pH 7

...as it flows into a creek in northern Pennsylvania, from a large H₂SO₄ plant. It always meets State "clean streams" requirements for industrial wastes because of its L&N pH Control System which includes Speedomax recorder, L&N Control Unit, Valve Drive Mechanism, and pH electrode assemblies like this flume-mounted unit.

The first step in applying this close control is L&N's pH Controllability Analysis. This unique appraisal of the process's controllability factors (type of waste, variations in flow and concentration, etc.) tells us whether your presently-installed treating process is actually controllable

within the limits you impose, and if not, what must be done to *make* it controllable. Then we translate these data into the answers you need to engineer an efficient treatment system.

Process Data Sheet 700(2), "L&N Speedomax Control of Plant Waste Disposal Processes," explains this unique and successful approach to waste treatment. Write Leeds & Northrup Company, 4956 Stenton Ave., Phila. 44, Penna.

LEEDS  **NORTHRUP**
instruments automatic controls furnaces



First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

Mr. John S. Lea, Vice President, Kelley Manufacturing Company, Houston, Texas, reports:



"Republic Electro Paintlok® forming and application

"Republic Electro Paintlok is the ideal material for one of our major product lines, acoustical fastening members," continues Mr. Lea. "Fabricating the sheet into H and Z members, splines, angles and couplers requires extreme forming and bending. We know from past experience that the special coating on Republic Electro Paintlok won't crack, flake or peel off no matter what we do. This means that after painting and installation, Kelley Acoustical Fastening Members provide our customers maximum satisfaction almost indefinitely, with little or no maintenance at all."

This example is typical of the improvement made possible in an endless variety of products through the use of Republic Electro Paintlok. In addition, this

versatile sheet often allows substantial savings in production time and money because it is shipped from the mill in prime condition for painting. In many cases only the final finish need be applied to provide full protection and attractive appearance. Cleaning and priming may be eliminated.

Finally, the chemically treated zinc surface of Electro Paintlok retards corrosion even when scratched through, and effectively limits it to the point of damage.

Get all the facts on this versatile sheet steel product and how it can help solve your forming and application problems. Simply contact your Republic representative or mail coupon.



STRUCTURAL APPLICATION PROBLEMS requiring low weight plus high strength are best solved using tubular construction. A good example is this rocket sled designed to withstand extreme forces of abrupt deceleration. Republic ELECTRUNITE® Steel Mechanical Tubing is ideal for such an application. Uniform in wall thickness, concentricity, strength and ductility, it permits reduction in bulk without sacrifice of safety. Send coupon for data.



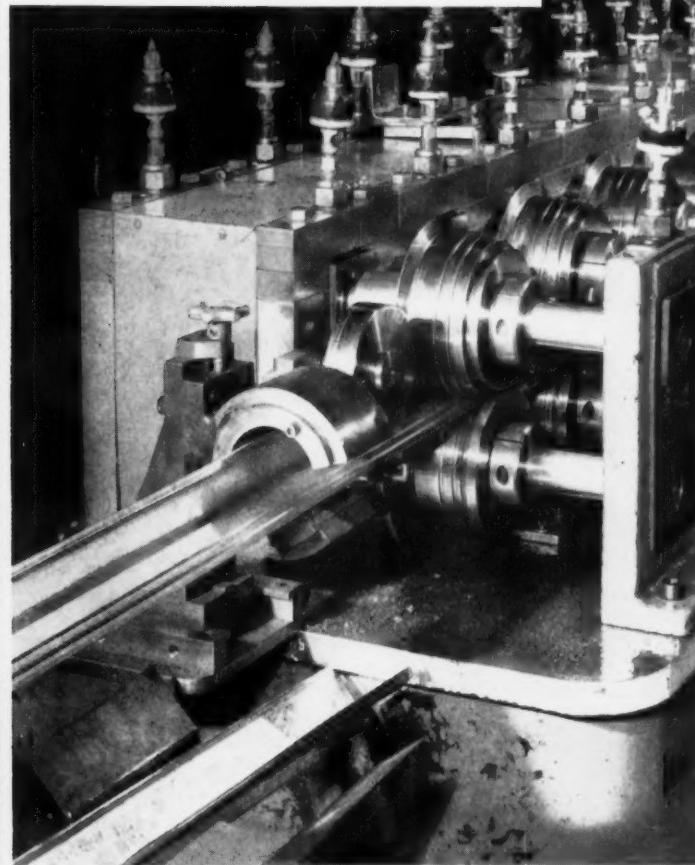
CORROSIVE APPLICATION PROBLEMS, like this coal-cleaning plant disc-type filter unit, demand the strength and corrosion resistance of Republic ENDURO® Stainless Steel. Here the stainless steel cloth used to cover disc segments is not only much more durable, but more than twice as efficient in recovering coal "fines" as the cotton cloth formerly used. To be sure of the best, specify ENDURO.

REPUBLIC



World's Widest Range of Standard Steels

solves our problems"



TYPICAL APPLICATION of Kelley Acoustical Fastening Members is shown in the ceiling at right. Base metal is Republic Electro Paintlok. Its special coated surface grips paint tightly, assuring years of maintenance-free good looks. Even severe forming, like the operation shown above, has no effect on its outstanding paint-holding characteristics. Coating will not crack, flake or peel off.



STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3071
3104 East 45th Street
Cleveland 27, Ohio

Please send me more information on:

- Electro Paintlok ENDURO Stainless Steel
 ELECTRUNITE Mechanical Tubing

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Now...load rate your bearings at higher values



with **Tru-Rol** CROWNED ROLLERS

Greater capacity . . . longer life . . . or a precisely balanced gain of *both* factors. That is the choice offered you by the "crowned" rollers of Tru-Rol bearings.

By finish grinding a carefully selected crown radius on roller ends, Rollway relieves high stress areas, insures uniform distribution of load over the entire length of the roller. Rollers can take heavier loads without excessive end-fatigue, and are less subject to the effect of slight misalignment or deflection.

The result is load rating at higher values for greater capacity, longer service life . . . or both. If this choice interests you, why not write for the complete story. Rollway Bearing Co., Inc., Syracuse, N. Y.

Tru-Rol Bearings with crowned rollers are available in 3 types

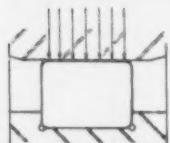


Stamped Steel Retainer
with Guide Lips

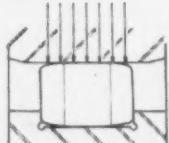
Segmented Steel
Retainer

Full Roller

Comparative Stress Patterns under Uniform Loads for Straight and Crowned Cylindrical Rollers

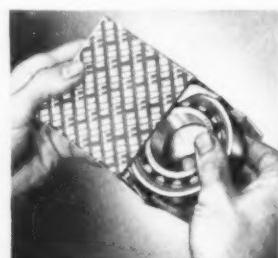


Stress pattern for a straight cylindrical roller under load. Note uneven end-loading.



Stress pattern for crowned roller under load. Crowning radius is exaggerated for clarity.

● Rollway engineering service is available to help you select exactly the right bearings for your needs. Write us.



ROLLWAY REPLACEMENT BEARINGS are available through authorized distributors in principal cities. Consult the yellow pages of your telephone directory — under "Bearings".

**ROLLWAY
BEARINGS**

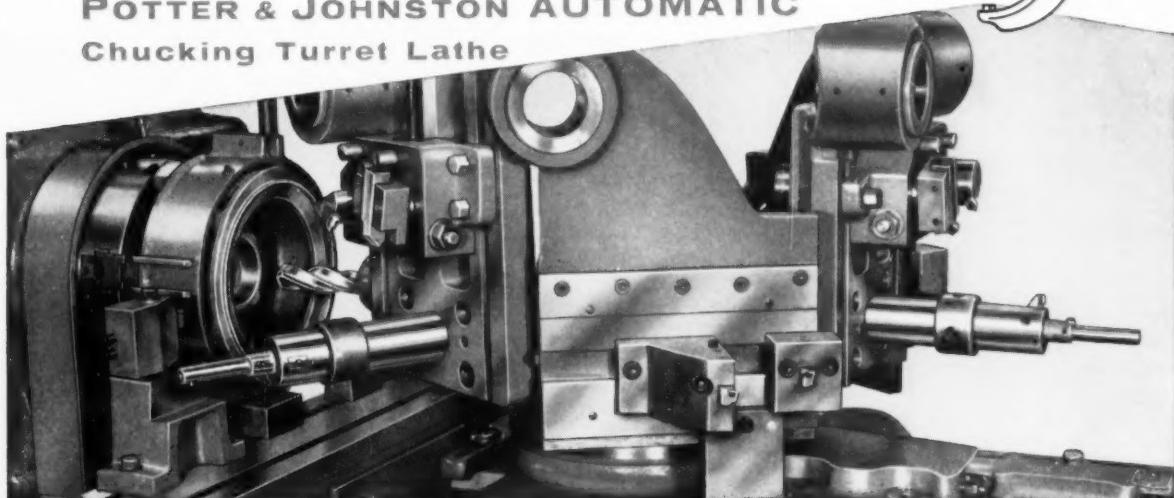
COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

**When the SQUEEZE is on --
do the job on a**

**POTTER & JOHNSTON AUTOMATIC
Chuck Turret Lathe**

$+.0005"$
 $-.0000"$



a job like this, for example . . .

BEARING BRACKET

CAST IRON

involving . . .

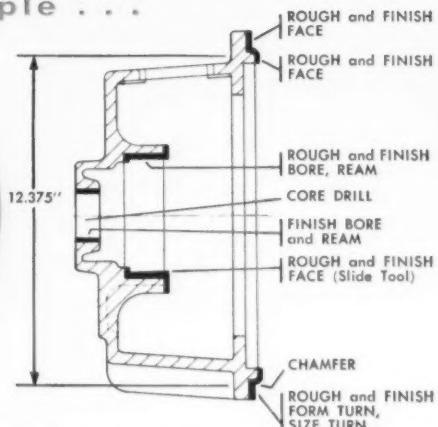
15 separate close-tolerance cuts including one diameter held to

HALF A THOUSANDTH !

**was finish
machined - -**

in just 4.31 minutes on a

P&J 5-DELX AUTOMATIX with P&J-ENGINEERED TOOLING



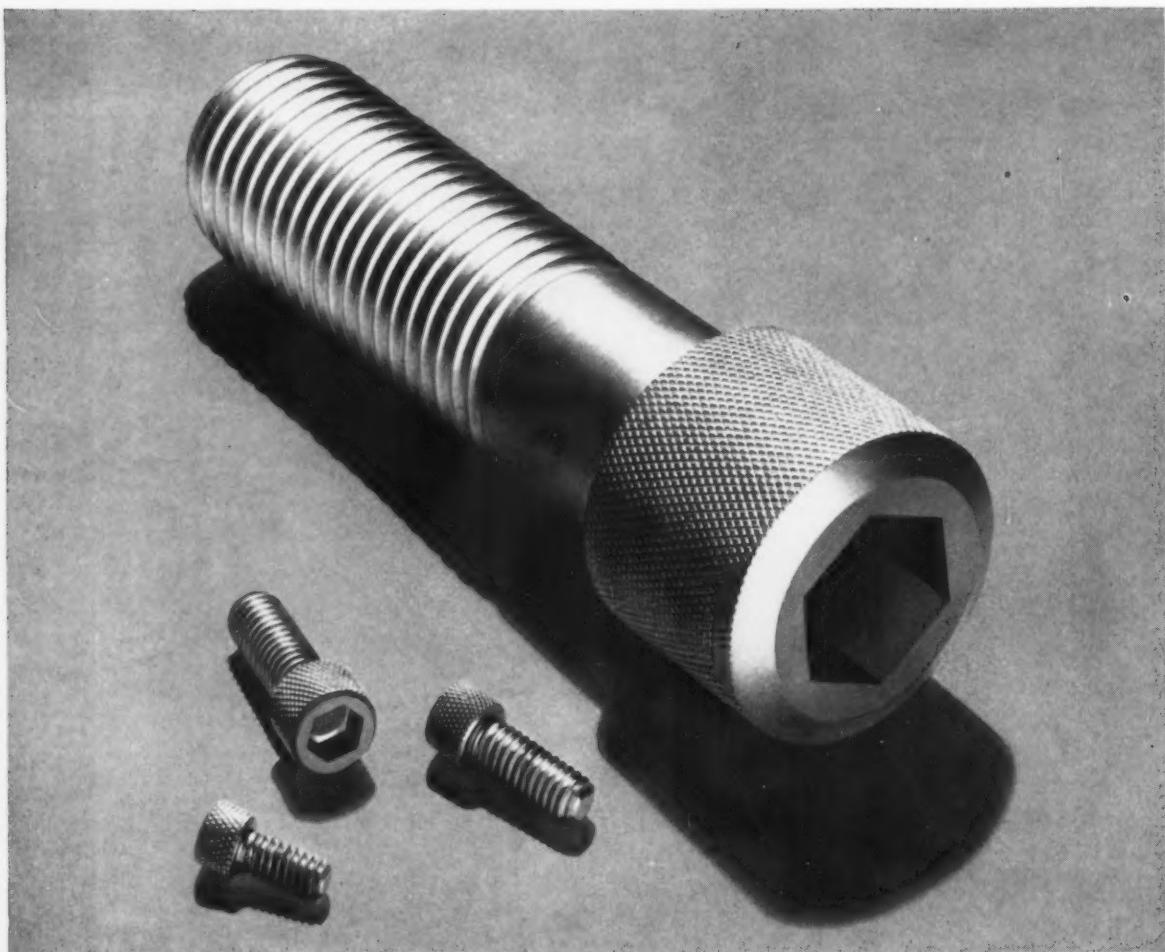
More and more jobs are calling for really close tolerances and fine finishes *plus* far faster production rates. Yes — today's higher standards mean the squeeze is on most of the time; these days you're expected to handle, as routine, jobs that were considered "specials" only a couple of years ago. There's just one way to beat the squeeze . . . profitably! Re-equip with Potter & Johnston Automatics that have the extra speed, power rigidity and versatility it takes to produce faster, more accurately and more econom-

ically. And team the machine with P&J-Engineered Tooling that takes full advantage of combined cuts and faster-biting carbide tools to reduce machining time to a minimum.

Write for literature or phone the Pratt & Whitney Office near you, and ask a Direct-Factory Representative to call and discuss your requirements. Potter & Johnston Company, Pawtucket, Rhode Island (Subsidiary of Pratt & Whitney Company, Inc.)



POTTER & JOHNSTON
Precision Production Tooling for More Than Fifty Years
AUTOMATIC CHUCKING TURRET LATHES



BRUTE STRENGTH FOR BIG ASSEMBLIES—

Cleveland large diameter upset forged socket head cap screws

On big presses, extrusion machinery, and earth moving equipment, fasteners not only have to support massive static loads; they must also withstand the dynamic stress of heavy impact, shock and vibration.

Engineered specifically for this type of service, Cleveland large diameter socket head cap screws are upset forged from specially heat-treated alloy steel. The forging process shapes the steel so that grain flow follows the contour of the head; eliminates planes of weakness along

which shear might occur under dynamic stress; and protects assemblies against fastener fatigue failure.

In large diameters we regularly stock 1 $\frac{1}{4}$ -7 and 1 $\frac{1}{2}$ -6 through 12 in. for same-day shipment. For other standard sizes from 1 $\frac{1}{8}$ to 3 in. diameter through 12 in. length, we have the stock and the tooling to produce your order quickly.* For prompt service, contact your local Cleveland distributor. He can also supply large diameter upset forged hexagon head cap screws.

*Diameters over 3 in., lengths over 12 in., available on special order.



THE CLEVELAND CAP SCREW COMPANY

4444-1 Lee Road, Cleveland 28, Ohio

WAREHOUSES: Chicago • Philadelphia • New York • Providence • Los Angeles



New folder gives dimensions (including old and new head details), physical properties, weights, prices of Cleveland large diameter socket head cap screws. Write for copy today.



Still in Use after 1½ Years of Heating and Quenching

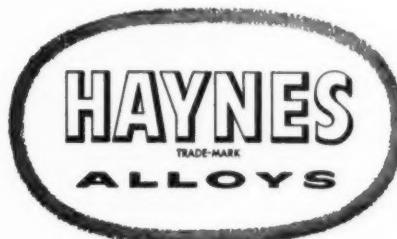
This tray, made of a HAYNES high-temperature alloy, has been subjected to continual heating and cooling for 18 months . . . and it is still in good shape.

In the heat-treating operation, trays and rings are heated to 1550 deg. F for a half hour and then given a rapid oil quench. This repeated exposure to high temperatures and thermal shock caused other trays to twist out of shape in a few days.

The HAYNES alloy used to solve this problem was HASTELLOY alloy C. There are 10 other HAYNES high-

temperature alloys—each designed to resist certain severe operating conditions. All of the alloys have remarkable strength at high temperatures, coupled with excellent oxidation resistance and dimensional stability. One of them may be the answer to a production or maintenance problem in your plant.

For information on prices, available forms, and properties of these alloys, write to our general sales office in Kokomo, Indiana or to any of the District Sales Offices listed below.



HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

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Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Haynes" and "Hastelloy" are registered trade-marks of Union Carbide and Carbon Corporation

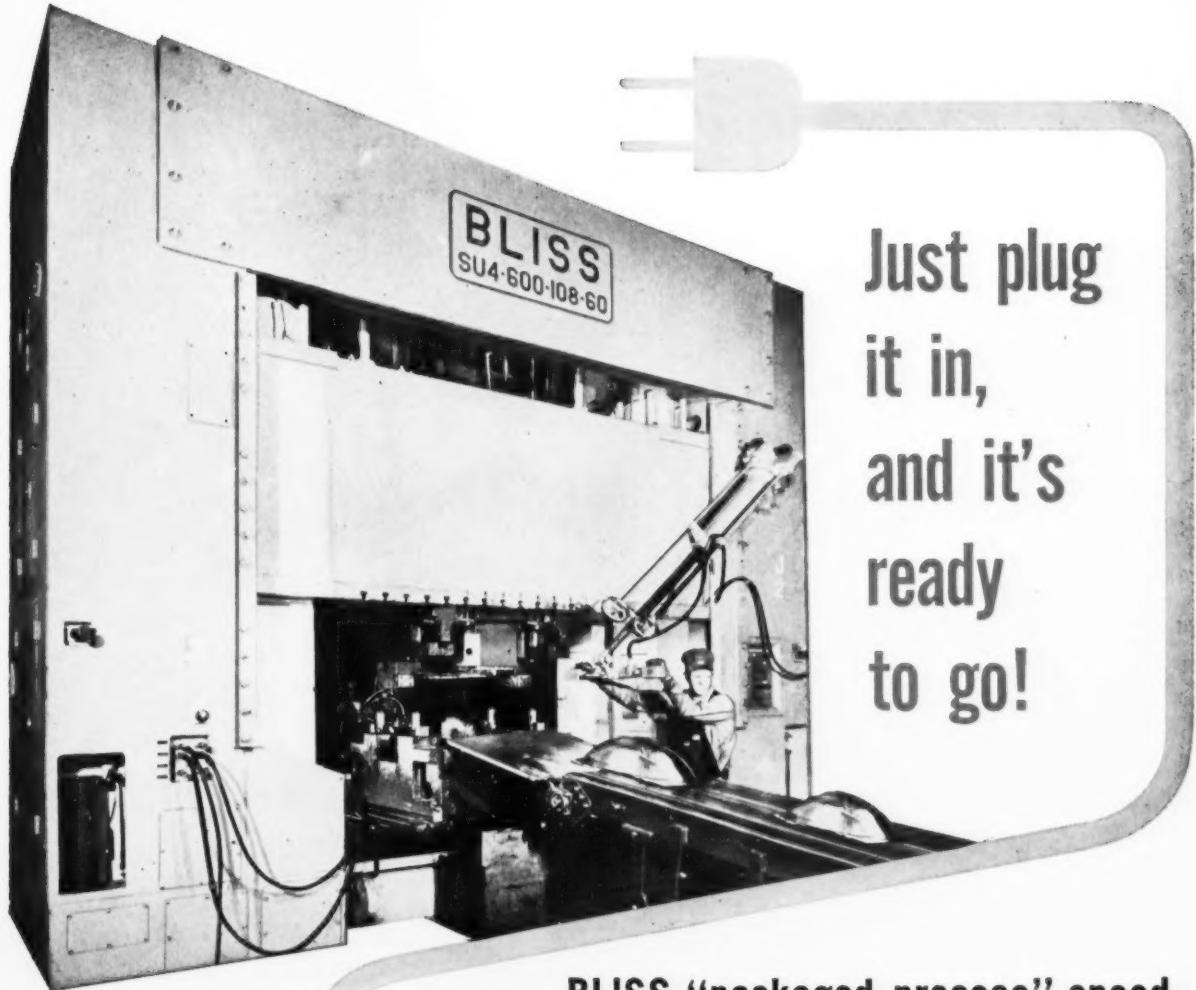
Roebling
Royal Blue Wire Rope
will wear and wear
and wear!



This working quality means longer service life on *your* job. Add to this the fact that Royal Blue is stronger than the strongest rope you have been using and you have two excellent reasons why it has enjoyed faster acceptance than any wire rope in Roebling's history. Your distributor or Roebling Sales Office will give you the complete story, or contact John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Distributors, Branches and Warehouses Throughout the Country—Subsidiary of The Colorado Fuel and Iron Corporation



Just plug
it in,
and it's
ready
to go!

BLISS "packaged presses" speed installation and simplify maintenance

Automation created the problem—The doppers, kickers, lifters and other materials handling devices so popular these days brought a maze of wires and pipes in their wake. And aside from looking untidy, they slowed maintenance and proved, annoying to crane operators.

"Packaging" solved it—Now, in Bliss' new line of presses, all the pipes and wires, and controls are built into the uprights. Each air and electrical line is tagged—simple to find, simple to fix. Controls are centrally located. The exterior is clean and uncluttered—cranes can move up close to change dies.

Bliss designers have come up with completely new two point and four point presses—both single action and multiple action. Design features include extremely rigid frames, eccentric drives, high speed clutches, extra long connections, motorized adjustments and many others. The entire line of presses is described in a comprehensive 32-page catalog, No. 11-B, just published. Copies for you and your staff are available by writing to E. W. Bliss Company.



NEW AUTOMATION CONTROL

This new nine-station rotary limit switch will control stops, starts, interlocks, motion, time, or recycles of auxiliary equipment. Each station can be set from 0° to 360°, can be operated either normally-open or normally-closed, and is accurate within less than 1°. Write for Bulletin 33.

BLISS

SINCE 1857

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E. W. BLISS COMPANY, Canton, Ohio

Presses, Rolling Mills, Rolls, Special Machinery

U. S. Plants in Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Midland and Pittsburgh, Pa.; San Jose, Calif.; Branch Offices in Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, San Jose, Salem, Toledo, Washington, D. C., and Toronto, Ontario, Canada;

E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co. (Paris), France.

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Carpenter stainless works



like this . . .

You know the pride of ownership when you can say "It's made of Stainless!" It's a pride based on the secure knowledge that the product symbolizes long-lasting beauty that's really more than skin-deep. No rust, no plating to peel, lasts for a lifetime. Next time, be sure . . . and specify Stainless.



because of consistent uniformity bar after bar

when you want RESULTS . . .

in definitely improving fabrication of stainless steel, call Carpenter. For example, some time ago a large manufacturer of golf clubs asked Carpenter's help in changing to stainless for golf club heads. Some of the big problems involved were the many unfamiliar stainless fabricating operations (such as cold trimming, broaching, drilling, tapping, stamping, etc.). These operations made a uniformly free-machinable grade highly necessary. A Carpenter Free-Machining Stainless of "forging quality" proved its ability to take the severe forging operations involved, with no change in previous fabricating techniques. Through the years, this Carpenter grade has helped the company build product acceptance and user satisfaction.



when you want ACTION . . .

on your free-machining stainless needs, dial your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. Immediate delivery from large local stocks is more than a claim . . . it's a fact . . . with Carpenter. Turn valuable plant space you've been using for implant steel inventory into profitable production space. Let your Carpenter Warehouse save you the cost and trouble of maintaining large stocks of specialty steels. Whether you want a few pounds or a few tons, Carpenter can get it to your plant faster. Dial the Carpenter location nearest you for service the way you want it.



Carpenter

Free-Machining Stainless Steels

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.



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Man on the left claims that Tru-Steel does the best cleaning job at lowest cost. Fellow on the right swears by Malleabrasive. But they're both right! Tru-Steel is best on some jobs . . . Malleabrasive is best on others. Different jobs may call for different abrasives but the result should always be the same—the best job at lowest cost per ton of castings cleaned. Whichever you need, Pangborn has the right abrasive for your job. Our sales engineers are experts on abrasives. Ask the one in your area for his advice or write PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Maryland.



IN 50 LB. BAGS
Easy to handle
Easy to stack

Pangborn FOR
MALLEABRASIVE[®]
AND **TRU-STEEL SHOT**



These three users find LIMA tops in flexibility, speed and dependability

Like hundreds of others across the nation, these three typical crane users find Limas ideal for outside materials handling. They find Limas give smooth, precise lifts, move swiftly, stay on the job year in, year out with a minimum of maintenance.

Check these Lima quality features: Moving parts flame or induction hardened for longer life; weight distributed for maximum stability; anti-friction bearings at all important bearing points; big-capacity drums and sheaves that are easy on cables; propel and swing gears and power take-off enclosed in a sealed oil bath; torque converter (optional).

Mounted on rubber for maximum mobility, Limas are available in capacities up to 50 tons and will go anywhere a truck will go at speeds up to 25 mph. If mobility is not a factor in your operation, you can get crawler-mounted Lima cranes that will handle loads up to 110 tons. And readily interchangeable front end attachments—magnet, shovel, dragline and pullshovel—give Limas the versatility to handle any of your heavy lifting and digging jobs.

Get the complete Lima story from your nearby distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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LIMA SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

BALDWIN - LIMA - HAMILTON

Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works



Lima Type 44 Magnet Crane handling scrap in the yard of City Scrap Iron and Metal Co., Detroit. The owners say: "The purchase of this machine was based upon its outstanding capacity for long boom work with the 45-in. magnet, also upon the very economical and efficient service received from a Type 101 Lima which we bought a good many years ago . . . We consider the new Type 44 the finest machine for our type of operation that we know of."



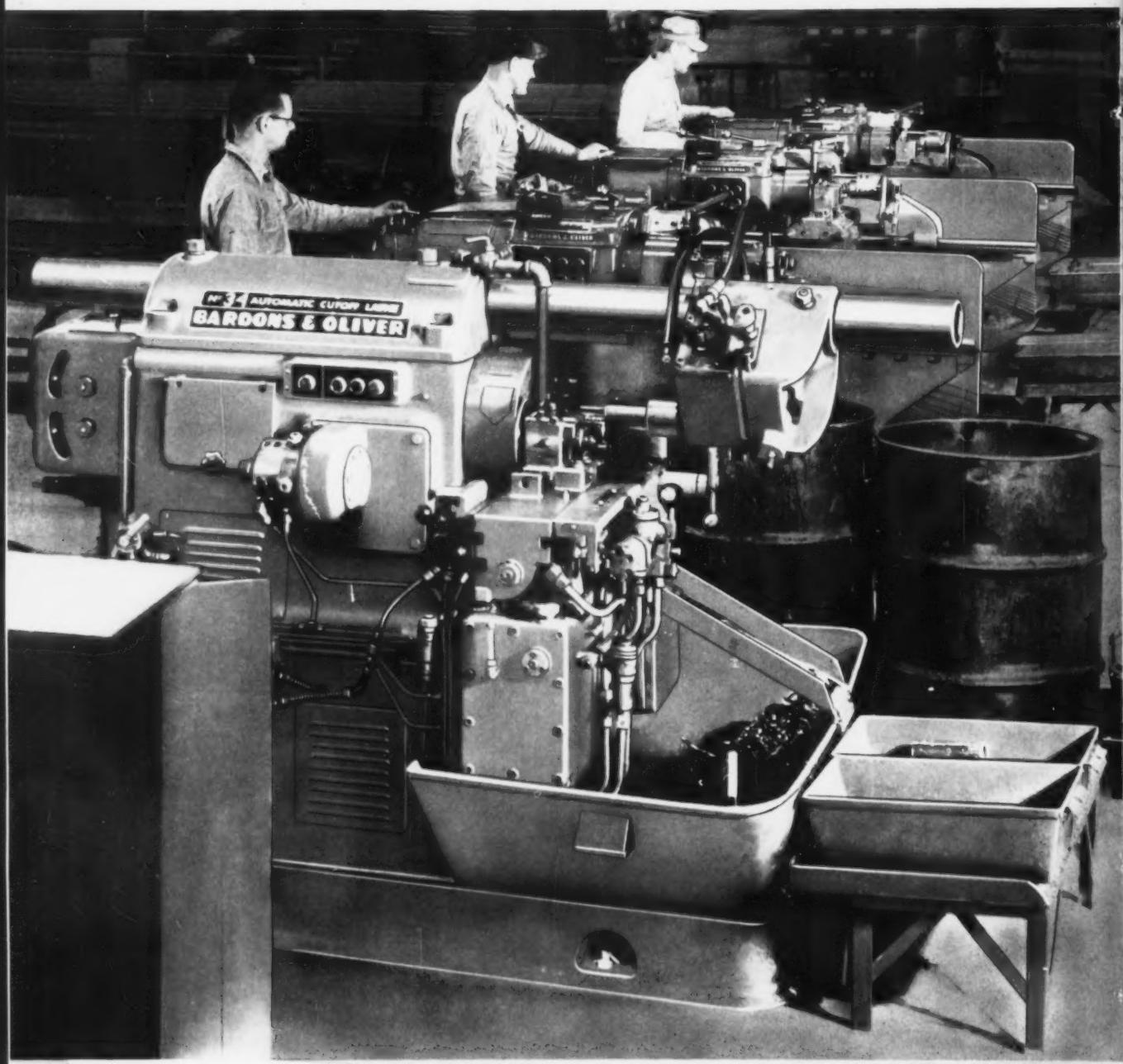
With a quick switch from hook to clamshell on the boom, Philadelphia Electric Co.'s three Limas can handle anything from loading slag or ashes to lifting bushings from transformers during repair work. They give constant peak performance with maximum flexibility, low maintenance and high availability.



Lima Type 44 Magnet Crane, one of three Limas working for Pevin Iron & Metal Co., Detroit. Pevin says: "The metal business is based on quick handling and turnover of scrap materials. As timing is very important, we have found it most satisfactory to buy Lima machines, due to their dependability and capacity. It is our opinion, after 25 years of operation, that Lima cranes are unequalled in low maintenance and outstanding performance."

GRINNELL CORPORATION

IN ITS MANUFACTURE OF PIPE NIPPLES



Bardons & Oliver Cutting-Off Lathes are available in eight sizes ranging from 2" dia. capacity to 16", and are built as Automatic, Semi-Automatic or Hand Operated.

Standardizes on **BARDONS & OLIVER** Cutting-Off Lathes

AUTOMATIC
SPINNING SYSTEMS
PIPE HEATING AND
COOLING SYSTEMS
AIR CONDITIONING
EQUIPMENT

IN REPLY REFER TO ~

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE 1, R. I.

DANA & PAIGE AVENUES
WARREN, OHIO

January 8, 1957

Pipe fittings and
valves
Plumbing and
air conditioning
machineries piping
and supplies

Bardons & Oliver, Inc.
1133 West 9th Street
Cleveland, Ohio

Gentlemen:

The four (4) Bardons & Oliver Automatic Cut-off Lathes which we installed last year to produce our pipe nipple blanks are giving satisfactory performance and effecting substantial cost reduction.

Since our new Bardons & Oliver Lathes form a concentric chamfer at each end of the nipple blank while cutting it off, the cutter life on the subsequent threading operation is increased.

Another substantial benefit derived from the installation of your Cut-off Lathes is the accurate and uniform lengths of nipple blanks produced. This assured control of length permits automatic feeding of the nipple blanks to the threading machines without the jam-ups and breakdowns previously experienced. Furthermore, it results in the production of a more accurate and more saleable pipe nipple.

Based upon the savings outlined above, the Grinnell Corp. has standardized on Bardons & Oliver equipment for cutting and chamfering their complete line of pipe nipples from 3/8" to 2-1/2" sizes.

Very truly yours,

GRINNELL CORPORATION


J. D. Sidells
Plant Engineer

JDS:PK

cc: (2)

PRODUCTS SOLD EXCLUSIVELY BY GRINNELL COMPANY, INC. AND GRINNELL COMPANY OF THE PACIFIC

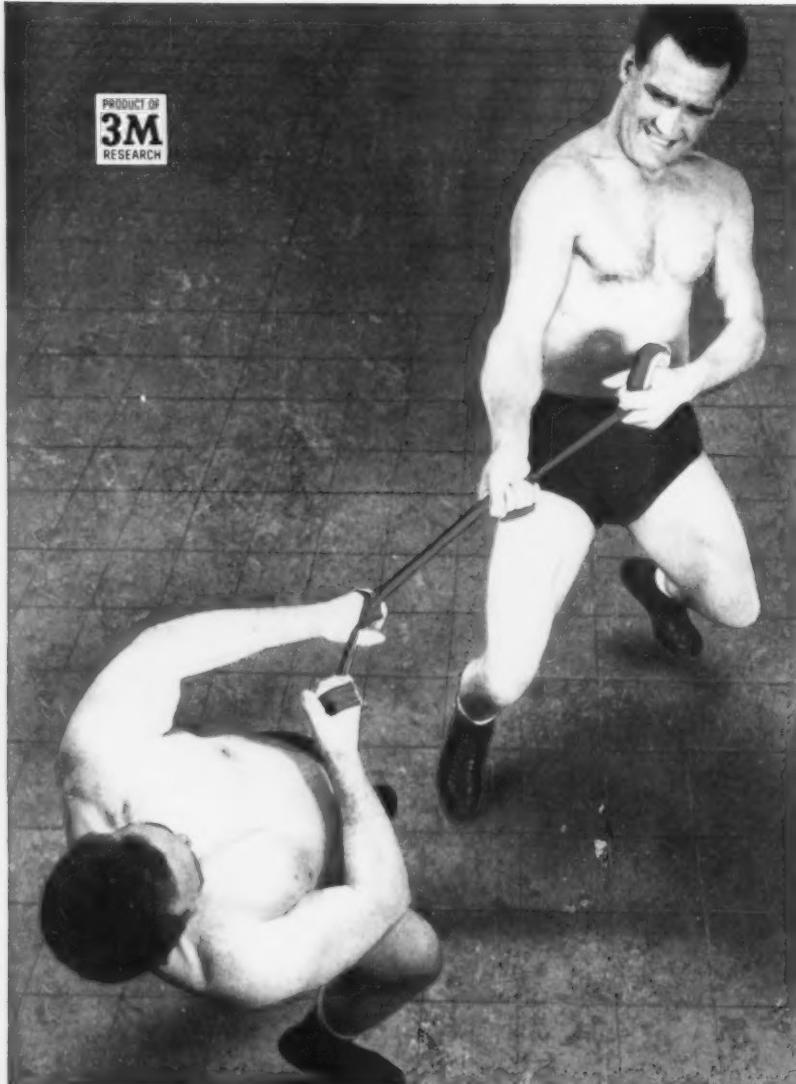
BARDONS & OLIVER, INC.

1136 WEST 9TH STREET

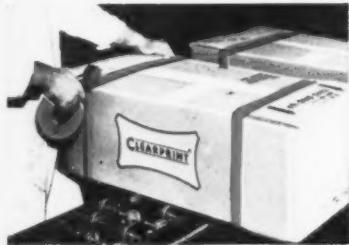
CLEVELAND 13, OHIO

MANUFACTURERS OF A COMPLETE LINE OF TURRET LATHES AND CUTTING-OFF LATHES

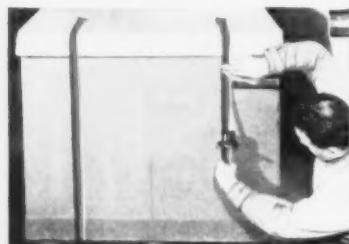
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can do with it!



HARD-TO-HANDLE materials, such as paper sheets in bulk, can be easily packaged using "SCOTCH" Brand Filament Tape. Super-strong tape both seals and reinforces covering.



LARGE cartons and expendable pallets are easily closed and reinforced with "SCOTCH" Filament Tape. Tape won't cut workmen's hands; won't harm contents; is easily disposed of.



MAKE your own containers for odd-sized or odd-shaped products with fibreboard padding and "SCOTCH" Filament Tape. "Mirror surface" adhesive sticks at a touch; holds securely.



SEND FOR free booklet showing how "SCOTCH" Brand Filament Tape can help solve your heavy-duty packaging and materials-handling problems. Write on your letterhead to 3M Co., St. Paul 6, Minn., Dept. DE-37.

World's strongest tape?

Even 468 lbs. of wrestlers can't break it! "SCOTCH" Brand Filament Tape is amazingly strong, super shock-resistant. Thousands of filaments imbedded in the pressure-sensitive adhesive give it up to 500 lbs. tensile strength per inch of width. Four colors: Red, Blue, Black, White and Transparent. Ask your regular tape distributor how you can use it for heavy-duty packaging, or write us direct. Always specify "SCOTCH" Brand, the quality tape . . . and stick with it!

FILAMENT TAPE . . . one of more than 300 pressure-sensitive tapes for industry, trademarked . . .

REG. U. S. PAT. OFF.

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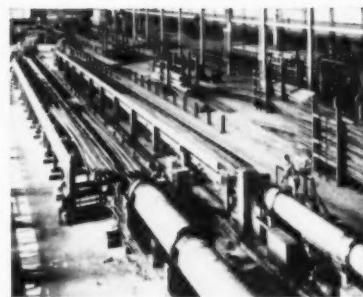
See you at the Packaging Show . . . Booth 1025

The term "SCOTCH" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.



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Single, Double, Triple & Five Draw
Wire Drawing Blocks
Loading Racks
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Pinch Rolls
Carriage Head (Air-Operated)
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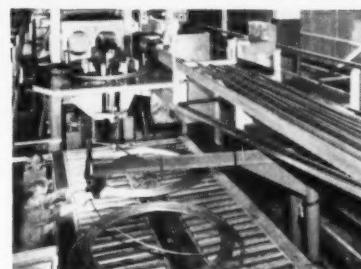


5-DRAW

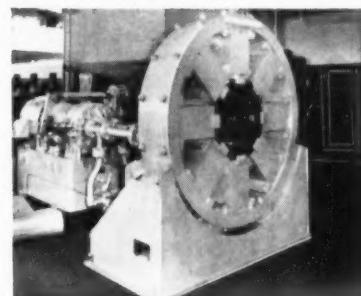
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for TUBES . BARS . SHAPES

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Run-Out Tables
Gag Straightening Presses
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BULL BLOCK



SQUEEZE POINTER

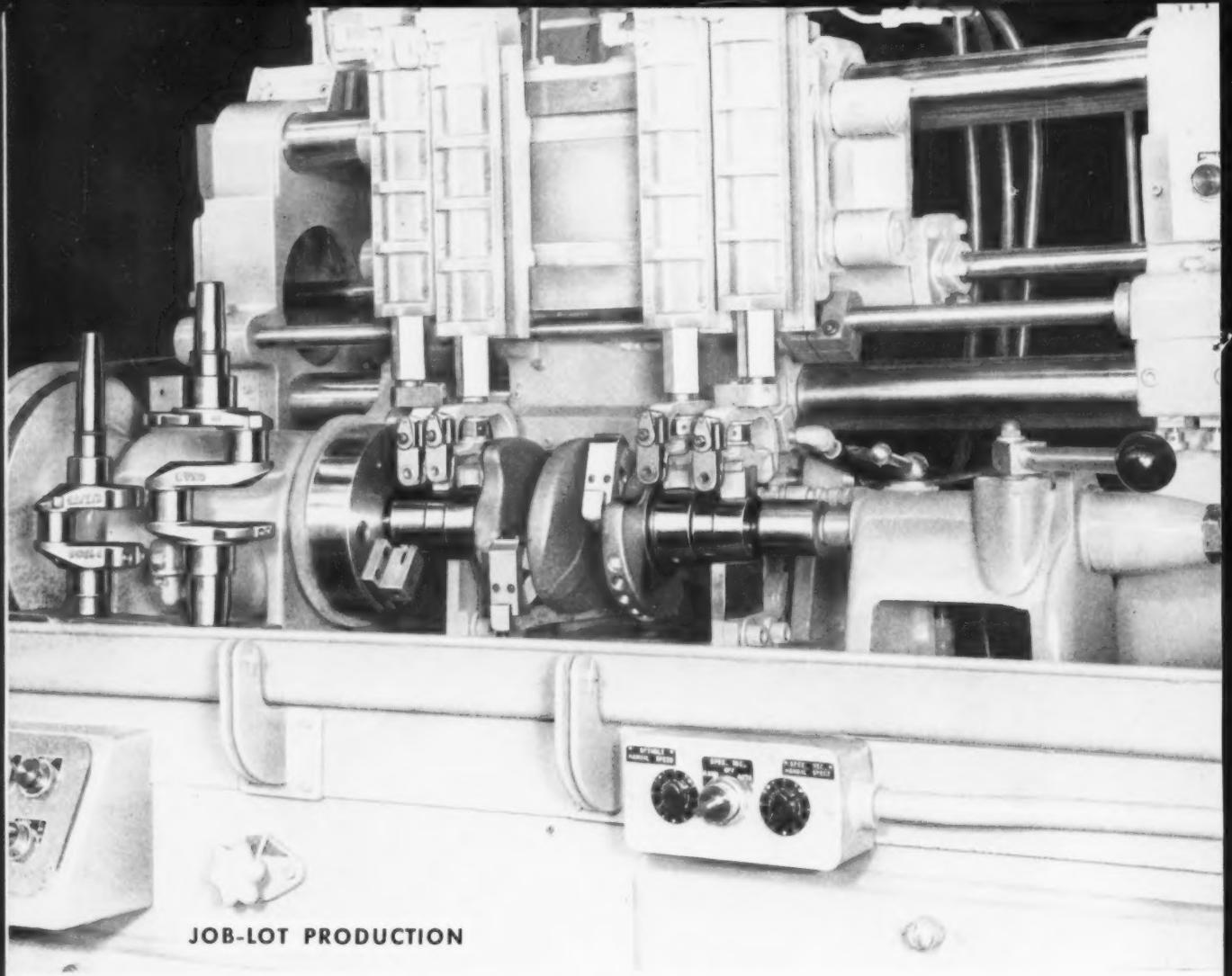
AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA.

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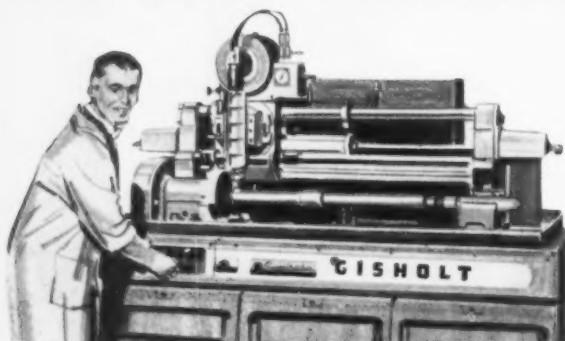


JOB-LOT PRODUCTION

No. 51A General Purpose Superfinisher

CRANKSHAFTS in small job-lots are Superfinished with this setup—holding the piece between centers and driving from a keyway with a faceplate driver. Latch-on follower-type arms Superfinish the crank pins, while the main bearing and oil seal surfaces are Superfinished by standard overhead quills. Main and pin bearings are taken from a ground surface of 30 micro-inches down to 8 or less. Oil seal surfaces on shaft ends are Superfinished to 4 or less. Production: 44 to 53 pieces per hour at 80% efficiency.

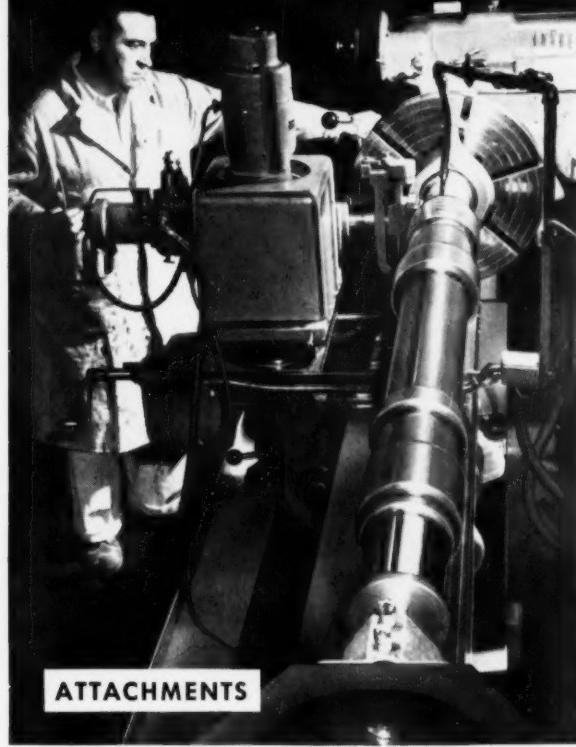
NEED SMOOTHER SURFACES AT LOW COST? See the



BEEN LOOKING FOR AN INEXPENSIVE PROCESS to improve product quality—to help market your product easier against increasing competition?

Gisholt Superfinishing may well be your answer ... it has been for some time for a long list of leading manufacturers.

With this modern process, you'll definitely reduce—or even eliminate—the cost and time of grinding, polishing or buffing operations. With the exclusive Gisholt Superfinishing method, you utilize a "scrubbing" effect through an abrasive stone which oscillates as the work rotates. Chatter marks, grind-

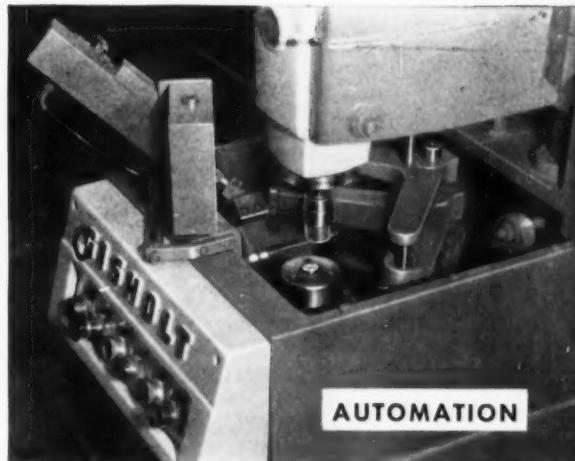


No. 4 Superfinisher Attachment

AXLE JOURNALS for railroad switchers are Superfinished with No. 4 Attachment on Gisholt Saddle Type Turret Lathe in this operation. In three steps, lathe finish of 200-250 micro-inches RMS is reduced to final surface finish of 8-10 RMS, removing .004" to .005" stock to eliminate tool marks. Through Superfinishing, 25 switchers logged 30,000 trouble-free hours on journals in first few months.



Superfinished tappet with
.005-inch crowned top.



No. 81 High Production Superfinisher

CAST IRON VALVE TAPPETS are Superfinished in long runs on this job, featuring fully automatic handling with a work transfer device. Cup-shaped stones are used, Superfinishing from flat ground surface down to 5 micro-inches RMS or less—and rotating off center to generate .005" crown on the cam end of each tappet. In only 16 seconds floor-to-floor time per piece, the valve tappets are economically Superfinished for longer wear life and better product quality.

NEW GISHOLT MASTERLINE SUPERFINISHERS

ing flats, and amorphous "smear" metal left by grinding are completely removed. The true base metal is exposed—providing longer wear and better performance from your product.

Better still, most Superfinishing jobs are done in a fast, automatic cycle—producing very low microinch surface readings in the shortest possible time.

The jobs shown here are typical examples where Superfinishing solved production problems and improved product quality. Ask your Gisholt Representative to tell you about them—and many more—in full detail. Call him today!

WRITE TODAY for 30-page illustrated booklet "Superfinishers," explaining Gisholt Superfinishing process in interesting detail.



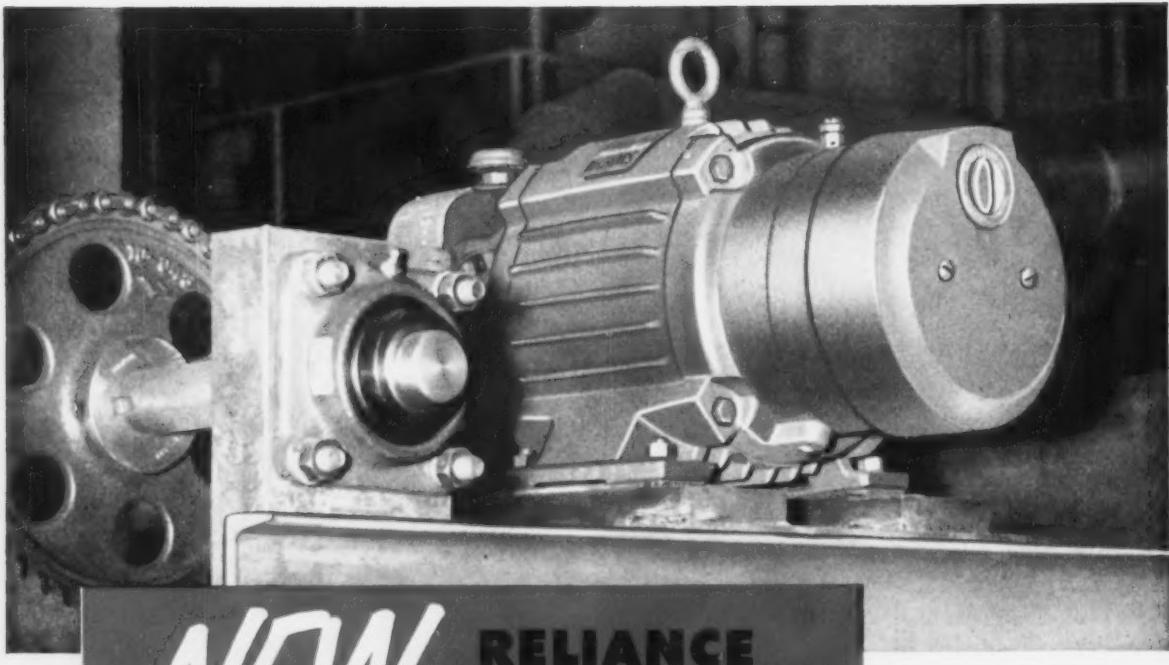
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MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.



TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS



NEW RELIANCE BRAKEMOTOR

These new motors are specifically designed for tough operating conditions. Corrosion-proof cast-iron housings and sealed joints make this motor impregnable to foreign material.

Braking torque ratings from 3 ft. lbs. thru 345 ft. lbs. Fail-safe mechanism immediately applies brake in case of power failure. One piece molded brake linings provide fast, smooth stops and unmatched holding power for heavy loads.

Simple brake has only six parts and requires no control wiring or auxiliary electrical equipment. Compact construction requires a minimum of space. Wearing parts are easily accessible for fast maintenance.

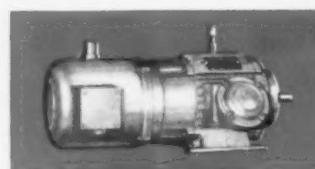
For further information write for bulletin B-2503.

B-1533

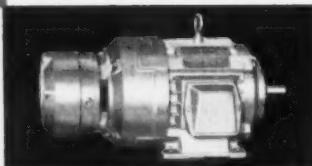
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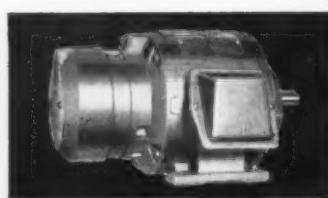
Explosion-Proof—Cl. I, Gr. D and
Cl. II, Grs. E, F & G



Totally-Enclosed, Corrosion-Proof

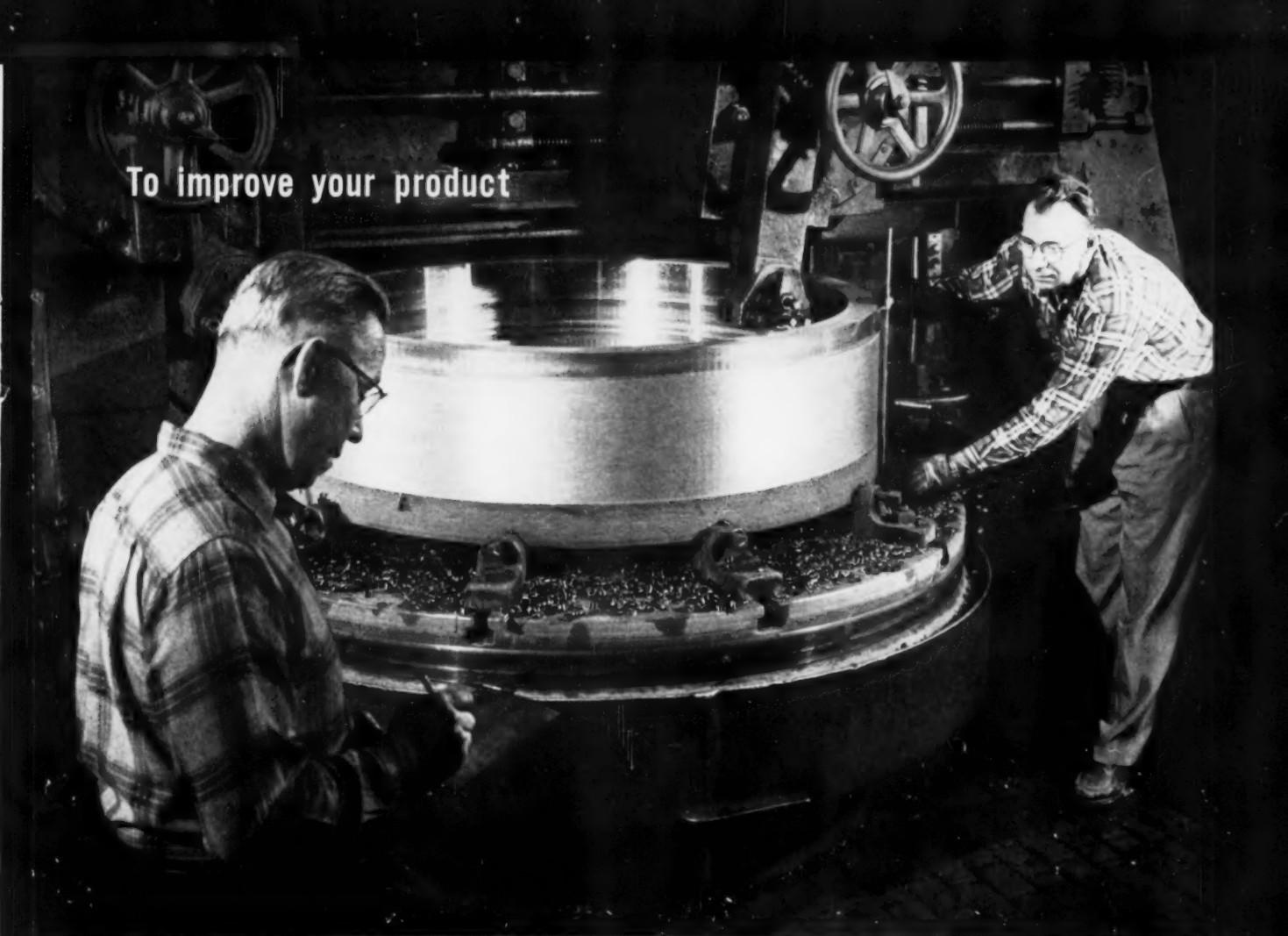


Corrosion-Proof Gearmotor



Protected





To improve your product

BUY PROFIT IN ALCO CIRCULAR FORGINGS

Hi-Qua-Led* Steel forgings, available in any AISI Open Hearth Grade, can reduce machining time more than half, or increase tool life up to 1600 per cent. ALCO's experience and equipment build cost-reducing uniformity into standard circular forgings from 18- to 145-in. OD.

The big news is Hi-Qua-Led Steel. It was developed by ALCO to lower your machining costs on circular forgings—particularly in applications where a lot of metal must be removed. So far, customers using Hi-Qua-Led Steel forgings have reported as high as 69 per cent improvement in turning time, 41.2 per cent in teeth-cutting time. Hobbing tool life has been increased up to 1600 per cent. Even surface finish has been improved markedly.

There is no change in steel properties in Hi-Qua-Led Steel. It can be expected to perform exactly like a regular steel in the same grade. Customers report same response to heat treatment as regular steels.

You can profitably use Hi-Qua-Led Steel forgings if you put four or more hours machining into a circular forged piece, or if you do hobbing or other tough machining jobs with expensive tools. If your machining is not extensive, ALCO's regular circular forgings can still save you money with their high uniformity and exact conformance to your specifications.

We'd like you to have full information. Your nearest ALCO sales office will be happy to provide it, or, if you wish, you can receive complete explanatory information in Bulletins SF-1 and SF-2 by writing Spring & Forge Division, Dept. OCF-1, P.O. Box 1065, Schenectady 1, New York.

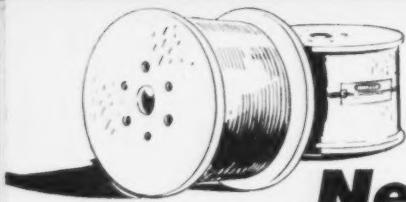
*Trademark reg. applied for. Patent applied for on lead-addition method.



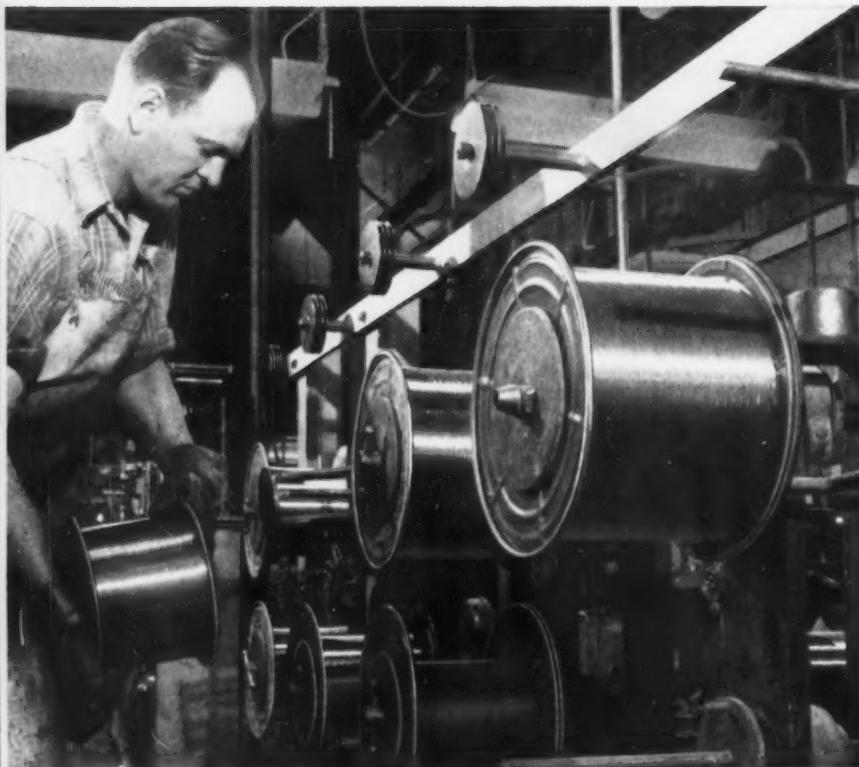
ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities



New Discard-a-Spool Reduces Thermoid's Wire Rewind Loss to $\frac{1}{2}$ of 1%



Light-weight Discard-a-Spool fits easily and quickly on let-off equipment.



Discard-a-Spool cut wire losses in rewinding to less than $\frac{1}{2}$ of 1 per cent.

**Johnson Steel's New
One-Way Spool Weighs
28 Ounces vs. 200 Ounces**

In a mountain-lined valley in Utah, a year-long test of an improved method of packaging fine wire has been stamped "a complete success."

Thermoid Western Division, Thermoid Company, Trenton, N. J., one of the nation's top manufacturers of wire-reinforced rubber hose, has given full approval to Johnson Steel & Wire Co.'s new Discard-a-Spool.

Light-weight, non-returnable Discard-a-Spool underwent testing in actual production at Thermoid's plant for many months. The result: now Thermoid specifies that all hose wire be delivered on new Discard-a-Spools.

Discard-a-Spool offers you these advantages over competitive packaging methods, whether made of metal or tempered Masonite:

- **It weighs only 28 ounces** and slashes tare weight by 14 times.
- **Fully protects the high quality** hose wire from contaminants and in-shipment damages. Overlaps and tangles are eliminated, the wire's critical surface finish is guarded.
- **Shrinks Thermoid's wire losses** in re-winding to less than $\frac{1}{2}$ of 1 per cent.

Through substitution of Discard-a-Spool for the heavier, must-be-returned steel spool formerly used, Thermoid computes substantial savings.

A typical package of the new wire consists of 36 Discard-a-Spools in a sturdy, two-layer cardboard box. The box is steel-strapped to a wooden pallet for easy handling by fork-lifts. The entire package weighs approximately 2,385 pounds gross, or 2,250 pounds net, producing a tare weight of 135 pounds.

Using outmoded, heavy spools, which weighed about $12\frac{1}{2}$ pounds and had to be returned to the wire mill, tare weight was 1,023 pounds for the same quantity of wire.

• **Major Supplier**—In the past 21 years, Johnson Steel & Wire has become one of Thermoid's major suppliers of hose wire for a wide variety



Johnson's high-quality hose reinforcement wire is fabricated into braids which form plies of strength around rubber tubing. As many as four braids can be plaited into reinforced rubber hose. At right, cut-away section shows plies of wire separating layers of rubber.

of high-strength rubber hoses.

At Nephi, Utah, Thermoid's hose wire braiding machines convert Johnson's wire into plaited sheaths around rubber tubing. The number of braids in a hose is determined by the end use of the hose. Thermoid builds dozens of different types of wire braided hose, ranging from $\frac{3}{16}$ inch to 4 inches in diameter. They vary from hose with a single ply, or layer, of plaited steel wire to 4 plies of practically unbreakable wire plaiting.

In a standard 50-foot length of four-ply, $2\frac{1}{2}$ inch hose, 38.5 miles of Johnson wire is used, fitting it for tough hydraulic pressure jobs like core, water and oil well drilling and sand busting in the oil fields.

Without steel reinforcing, rubber hose has a bursting resistance of only about 50 p.s.i. In the case of half-inch reinforced hose, the first ply of braid raises bursting strength from 50 p.s.i. to 10,000 p.s.i. A second layer increases it to 16,000 p.s.i. These are minimum figures, since Thermoid actually builds its hoses so that breaking points are four times maximum working pressures on the hose.

According to J. A. Muller, Thermoid's Director of Research and Development, the secret of building good hose rests on a number of factors. Among them is steel wire of high quality.

Thermoid selects Johnson wire because its structure meets or exceeds specifications. The wire surface is free of nicks which could cause premature fatigue stress or breakage during braiding operations.

• **Cleanliness Vital**—Good adhesion also requires a wire with a clean surface. To get superior adhesion Thermoid uses a dry assembly process for hose components.

These advantages of Johnson's wire are not the only benefits Thermoid gains. Johnson's products stay within the specified tensile ranges.



Johnson Steel is a major supplier of the high quality hose reinforcing wire Thermoid Western uses at its Nephi, Utah, plant. For 18 months, Thermoid cooperated with Johnson Steel & Wire Co. in extensive production tests of the new Discard-a-Spool.

Discard-a-Spools are lighter and easier to handle than returnable hose wire spools and made of either metal or Masonite they can be packed 36 to a carton. Johnson then straps the box to a wooden pallet, giving a further savings in time and shipping weight.



Variations in tensile can cause serious trouble in the braiding operations.

"Any deficiency in the wire shows up in winding or during the braiding operation itself," Mr. Muller explains.

It takes up to eight hours to set up the 120 bobbins on the big braider. One bad wire is enough to jam the machine and the cost to get it set up again is figured at \$245—\$35 for labor and \$210 for damaged and lost wire. The time lost adds still more expense.

The Utah plant, far from the na-

tion's wire producing mills, requires tops in quality and service.

Thermoid's experience with Johnson Steel & Wire Co. demonstrates why you should let Johnson handle your fine wire supply problems.

Johnson's full range of specialty wires and its progressiveness are your guarantee of satisfaction. Let a Johnson specialist explain how top quality wire or the latest packaging improvement—like the new Discard-a-Spool—can eliminate your worries. The Johnson man is experienced and willing. He's as close as your telephone. Give him a call today.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of Pittsburgh Steel Company

Grant Building

• Pittsburgh 30, Pa.

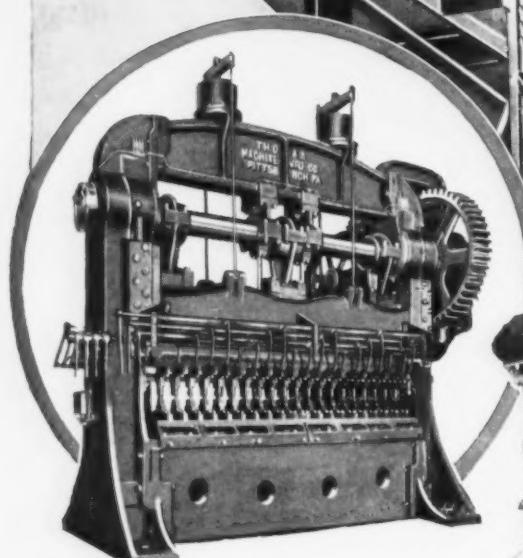
District Sales Offices					
Atlanta	Columbus	Detroit	New York	Tulsa	
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AS IN THE PAST HALF CENTURY

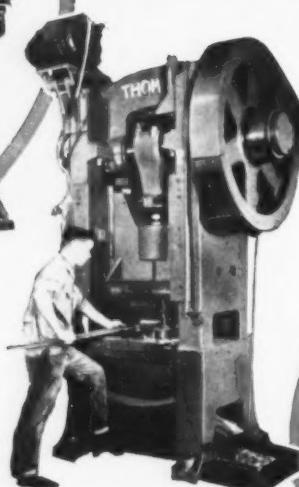
the trend is to Thomas
for '57



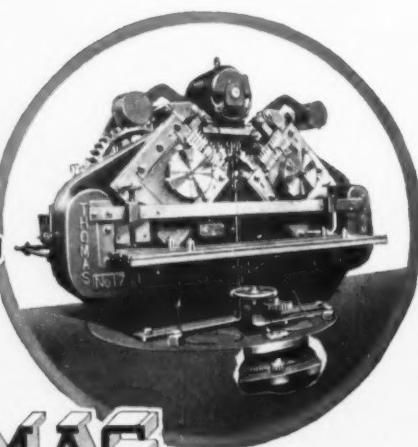
ABOVE — Modern Thomas power-driven Spacing Machine especially developed for the "short run" shop



EXTREME LEFT—Thomas 1,000-ton Multiple Punch built for railroad car shop



BELOW—This Thomas double-angle shears combines advanced design with typical Thomas dependability



ABOVE — Single-crank straight-side press, one of many Thomas models

For over 50 years Thomas has served the steel industry with equipment designed to increase output and decrease operating costs. Make sure the equipment you buy meets the needs of today...specify THOMAS.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

48

NOW! CLEANING COSTS DROP AGAIN

**NEW and BIGGER SAVINGS
effected in 5 areas by the new
WHEELABRATOR® SUPER TUMBLAST**

"Abrasive costs reduced 68% . . . no direct labor required for cleaning . . . original blades last 696 hours . . . castings cleaned 20% faster . . . no parts replacement required in first 2 months . . . blade costs cut 65.2%." Reports like this keep coming in from Super Tumblast installations in the field. Savings pile on savings. Operating economies, maintenance savings and increased productivity are combined in the Super Tumblast to give a new dimension to blast cleaning.

cleaning time drops again



parts costs drop again



abrasive cost drops again



maintenance costs drop again



man hours drop again



The Super-Capacity Wheel throws more than twice the abrasive in a more uniform pattern than any similar sized wheel previously used. Contaminants cannot retard cleaning because the abrasive separator, with 3 times the air separation area, assures having super-clean abrasive at all times.

The Super-Efficient Separator removes all highly-abradant contaminants before they can damage machine parts. The entire efficiency of the machine is thus increased, downtime is kept to a minimum and large savings are effected in parts costs.

The Super Tumblast gets more mileage from abrasive in 2 ways: First, it keeps all abrasive in the machine through a new Super-Sealed construction. Second, it removes all contaminants from the abrasive without removing any of the abrasive itself.

The entire Super Tumblast is designed for lowest maintenance. For example—high wear points are protected by Long-Lyre liners with 25 to 50 times longer life. The cleaning chamber is super-tight. The power-operated, one-piece reinforced door withstands impacts from inside and outside. The wheel has new blades for longer wear, a strain-free blade holding device, a new easy-service wheel guard housing, and a new system of wheel guard liners.

This is the first batch-type mill designed to provide the reliable performance required for automatic operation. It is readily converted to automation because of standard features such as power door, power closing plate, power abrasive controls, etc.

SUPER TUMBLAST now in 3 SIZES

Super Tumblast super savings are available to more plants because it comes in 3 sizes . . . 7 cu. ft., 14 cu. ft., 28 cu. ft. Write for literature.

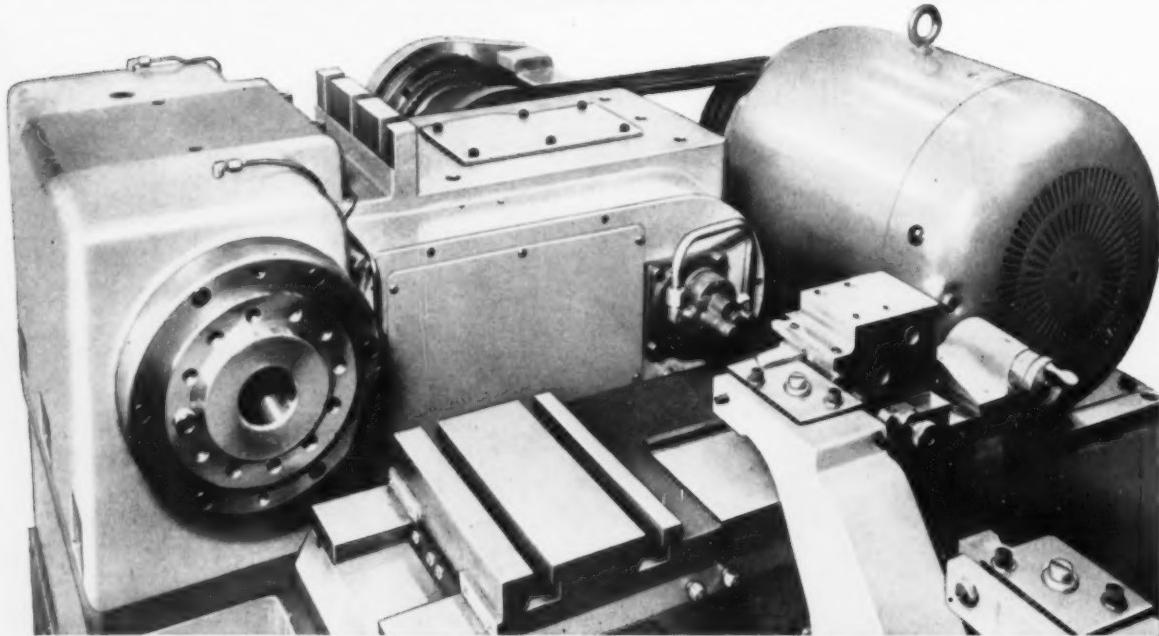


**WHEELABRATOR®
CORPORATION**

510 South Bykit Street, Mishawaka, Indiana

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY

WAGNER MOTORS mean less down-time for production machinery



This Wagner Type EP Motor is mounted on the base of the Reedmatic Production Lathe.

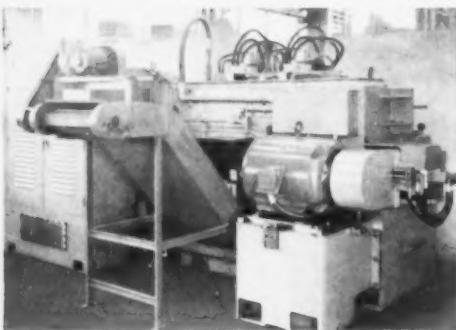
Wagner totally-enclosed fan-cooled motors will give your machine tools the drives they need to give continuous service.

THEY ASSURE LESS DOWN TIME. Wagner totally-enclosed fan-cooled motors are fully protected against damage from steel filings, chips, dust, dirt, fumes and moisture. This built-in protection assures freedom from excessive down time caused by motor failure.

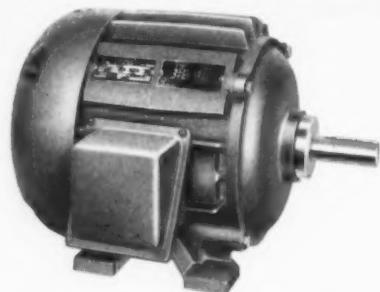
THEY REDUCE MAINTENANCE COSTS. Wagner

totally-enclosed motors require no maintenance other than periodic lubrication. These motors are designed to run cooler and longer between maintenance periods, but when greasing is necessary, readily accessible lubrication openings permit addition of grease or a complete relubrication.

A Wagner field engineer will be glad to help you design non-stop performance into your production machinery by recommending the motors that best fit your specific needs. Just call the nearest of our 32 branch offices.



This Reed-Prentice tracer controlled automatic production lathe, which turns automobile axles in 30 seconds, is equipped with Wagner Type EP totally-enclosed fan-cooled Motors. These motors are fully described in Bulletin MU-203. Write for your free copy today.



M57-6



BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

Wagner Electric Corporation
6103 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC



THEY SMASHED INTO THAT WEIRKOTE[®] TILL WE COULDN'T STAND IT!

When a half-ton steel wrecking ball smashes broadside on target—mister, that's a *test*.

Yet, when Weirkote zinc-coated steel is put through that, or equally brutal punishment, its zinc coating stays skin-tight throughout the ordeal.

Think of that demonstration in terms of *your* products, production steps and cost problems.

Weirkote's continuous-process zinc coating thrives on toughest fabrica-

tion steps—spinning, deep drawing, roll forming, extrusion. And there's no flaking or peeling.

With Weirkote, you can eliminate the cost of plating, painting or redipping after fabrication. In many instances, you'll get prolonged die life, too, due to the lubricating quality of Weirkote's zinc coating.

Free Weirkote Booklet

Send for the new booklet on Weirkote today. Write Weirton Steel Company, Dept. A-6, Weirton, West Virginia.



**WEIRTON STEEL
COMPANY**

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION





THE ELECTRIC DETECTIVE is an apt description of the Magnatest FM-100 Conductivity Meter. Magnatest uses the electrical conductivities of materials as a measure of uniformity, hardness, purity and other characteristics. A small hand held coil induces eddy currents in the test material, which in turn affect the impedance of the coil in proportion to the conductivity of the material.



IT'S JUST A LITTLE CRACK, but it's a serious matter when it shows up on an industrial crane hook. In fact, to the naked eye it may appear to be a scratch, at most. Yet it can open further and further under load. The end result: failure in service and subsequent costly damage. Photo above shows a Magnaflux indication of such a crack in a crane hook.

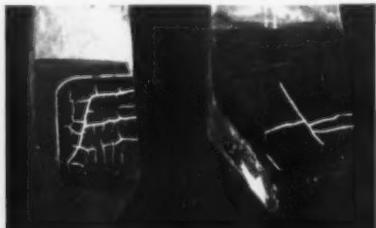
Case Studies: NONDESTRUCTIVE TESTING SYSTEMS



How Periodic Inspection Ups Production by Preventing Equipment Failures

When industrial equipment fails in use, it usually results in lost time, production, or even life! In each case there is a corresponding loss of money. The amount, of course, depends upon the circumstances. Periodic inspection with an M testing system can foretell the exact nature and extent of structural weaknesses in your machinery, tanks, or equipment.

Invisible hairline cracks are warning signs of future fatigue failure. The M tests detect such signs in any material. You can take the proper corrective steps in time to prevent costly production interruptions. Nondestructive testing can help you eliminate profit-draining equipment failures. —Investigate Magnaflux inspection methods today!



ZYGLO "SPOTLIGHTS" SERIOUS DEFECTS IN CUTTING TOOLS
Zyglo inspection employs an oil base penetrant that is brilliantly fluorescent under "black light". It detects surface cracks or pores when they may

affect the service life of any metal part. Whether you produce cutting tools, or use them, Zyglo provides better inspection at lower cost.



Write for complete details concerning any of the above case studies, or ask for our new booklet on "Lower Manufacturing Costs."

Take Your Inspection Problems to the House of Answers

MAGNAFLUX CORPORATION

7302 West Lawrence Avenue

Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 19 • Los Angeles 58

ATLANTIC STEEL CO. gets work done fast . . . and cheaply . . . with **BROWNHOIST CRANE**

Working with magnet, hook or bucket, this Brownhoist 30-ton Diesel Electric locomotive crane equipped with electric swing (shown here in the Atlantic Steel Co. yards) is typical of the hundreds of Brownhoist cranes that are doing—and have been doing—a tremendous amount of work rapidly and with economy throughout American Industry for the past 75 years.



BROWNHOIST

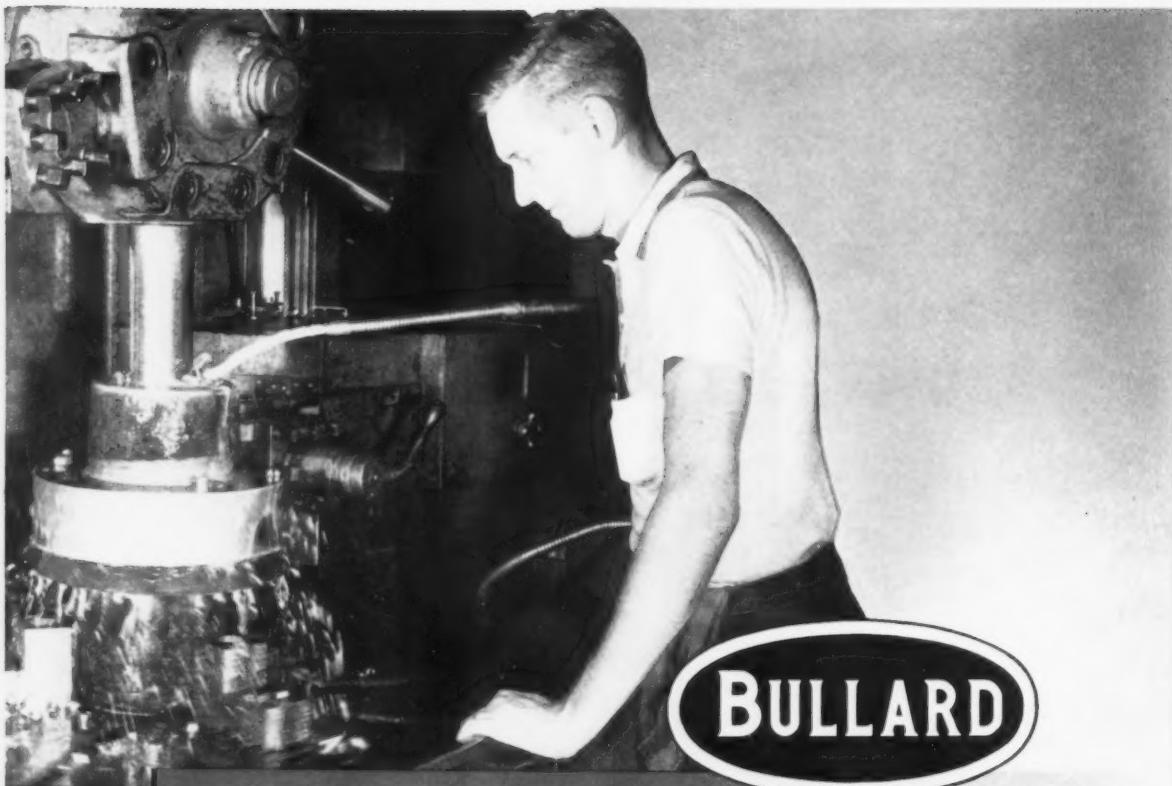
BROWNHOIST MATERIALS
HANDLING EQUIPMENT
GIVES A LIFT TO
AMERICAN INDUSTRY



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Philadelphia, Cleveland, San Francisco, Chicago; Montreal, Canada
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BULLARD

*"Less Maintenance—
Less Down Time
Increased our Production"*

This statement by Methods Supervisor Raymond Hoss of the Ingersoll Milling Machine Company of Rockford, Illinois summarizes one of the benefits they received from the purchase of a 36" Cut Master V.T.L., Model 75. Less operator fatigue, higher speeds, power chucking and power indexing turret are other factors which increase the overall production obtained with Bullard Cut Master, Model 75.

These same benefits can be applied to your production problems—just call your nearest Bullard Sales Engineer—he'll be glad to help—or write

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

CARBORUNDUM® INTRODUCES:

Maximum Automation Potential

newest concept in Abrasive Technology

*predicts metal removal savings with
abrasive belts before capital investment*

M-A-P is a new industrial forecast method. It is designed for automation-minded manufacturers whose production operations include heavy stock removal, finishing or semi-finishing of component parts. M-A-P predicts operating-cost savings and production increases resulting from the engineered application of the correct machine and abrasive belts—in advance of any investment in material or equipment.

M-A-P is actually the application of science to metal removal—economic science and abrasive science combined to take the guesswork out of grinding. M-A-P formulas were developed by The Carborundum Company's Coated Abrasive Engineers from a study of all standards and factors entering into abrasive belt grinding operations. M-A-P is based on the accumulated knowledge of Carborundum's years of coated abrasive manufacturing experience and the

abrasive machinery know-how of its Curtis Machine Division.

Maximum Automation Potential predictions are now available to you as a standard engineering service of The Carborundum Company's Coated Abrasives Division. To get an M-A-P study on one of your present or planned metal removal operations, you need only supply a few basic production facts. Carborundum engineers do the rest—M-A-P formulas are applied specifically to your operation—an *M-A-P Recommendation* is then mailed back to you. Now, with M-A-P you can *predict and compare return on investment*—without obligation.

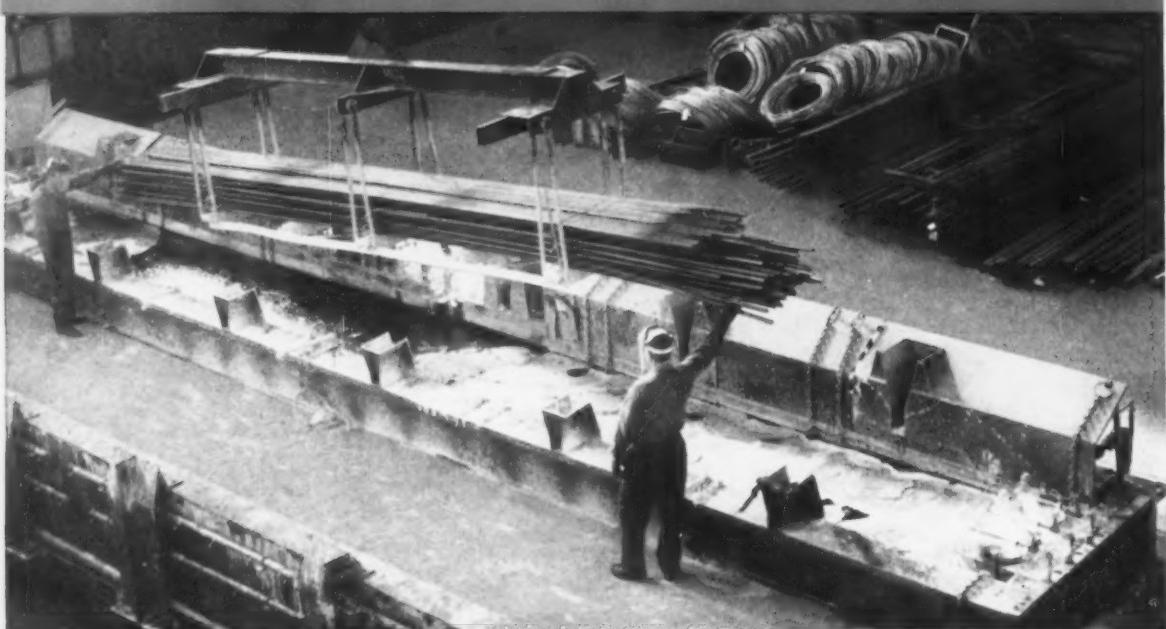
For further information, write to The Carborundum Company, Dept. 31, M-A-P, Senior Coated Abrasives Engineer. Ask for the M-A-P Brochure which explains this new engineering service to industry in detail.

The **CARBORUNDUM** Company
COATED ABRASIVES DIVISION
Niagara Falls, New York



Call **Rotary**

FOR QUALITY STAINLESS STEEL
... MADE THE MODERN WAY



IMPROVED DESCALING PROTECTS BASE METAL ... ELIMINATES PITTING AND ETCHING

This new Sodium Hydride Descaling bath is Rotary's answer to the problem of uniform, thorough descaling . . . another step forward in their determination to provide customers with only the highest quality stainless steel.

Watch Rotary—put your faith in Rotary—where new facilities and new methods combine to bring you only the highest quality stainless steel.

Send for your copy of 4-color brochure "How Steel is Made at Rotary."

The benefits of this new process are quickly apparent . . . and they are important!

- Thorough descaling—work comes out bright and clean and free of smut.
- No loss of base metal . . . close tolerances can be maintained.
- No pitting or etching . . . fine surface quality can be maintained.
- Safe operating temperatures . . . working temperature of descaling bath is well below the critical range.



STAINLESS BILLETS FOR FORGING IN COMPLETE SIZE RANGES

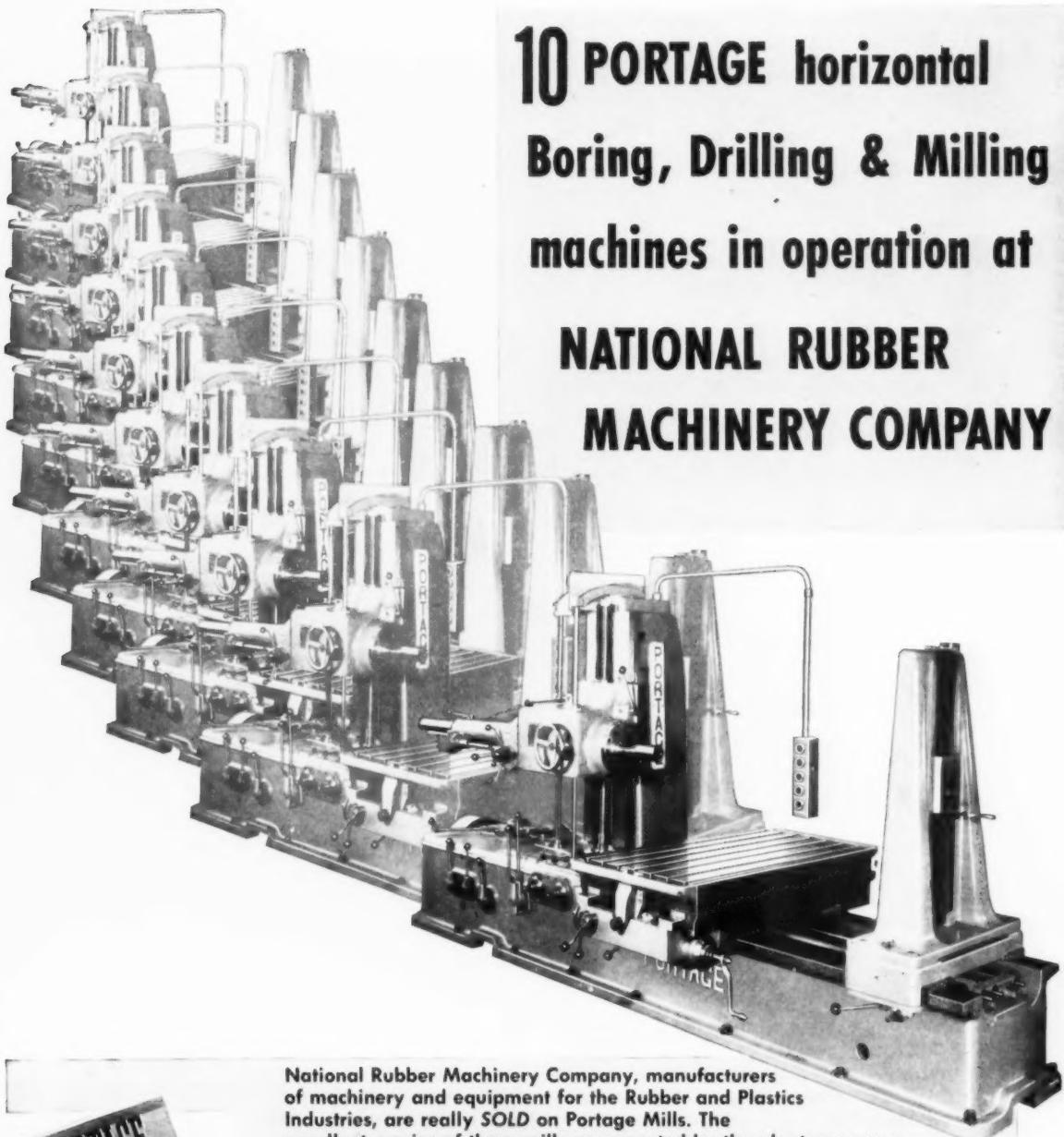
Rotary Electric Steel Co.

P.O. BOX 4606

DETROIT 24, MICHIGAN



ALLOY and
STAINLESS STEELS
BILLETS • SLABS
HOT ROLLED and
COLD FINISHED BARS



**10 PORTAGE horizontal
Boring, Drilling & Milling
machines in operation at
NATIONAL RUBBER
MACHINERY COMPANY**

National Rubber Machinery Company, manufacturers of machinery and equipment for the Rubber and Plastics Industries, are really SOLD on Portage Mills. The excellent service of these mills are reported by the plant managers at Columbiana, Ohio and the Akron Division plant. This large installation certainly represents a vote of confidence for the performance of Portage Mills . . . and speaking of confidence . . . many leading manufacturers have come to realize that the ruggedness, versatility and low maintenance cost of Portage Mills makes them the best buy . . . and remember . . . their initial capital investment cost is less, without the sacrifice of quality. Write for complete information . . . TODAY.

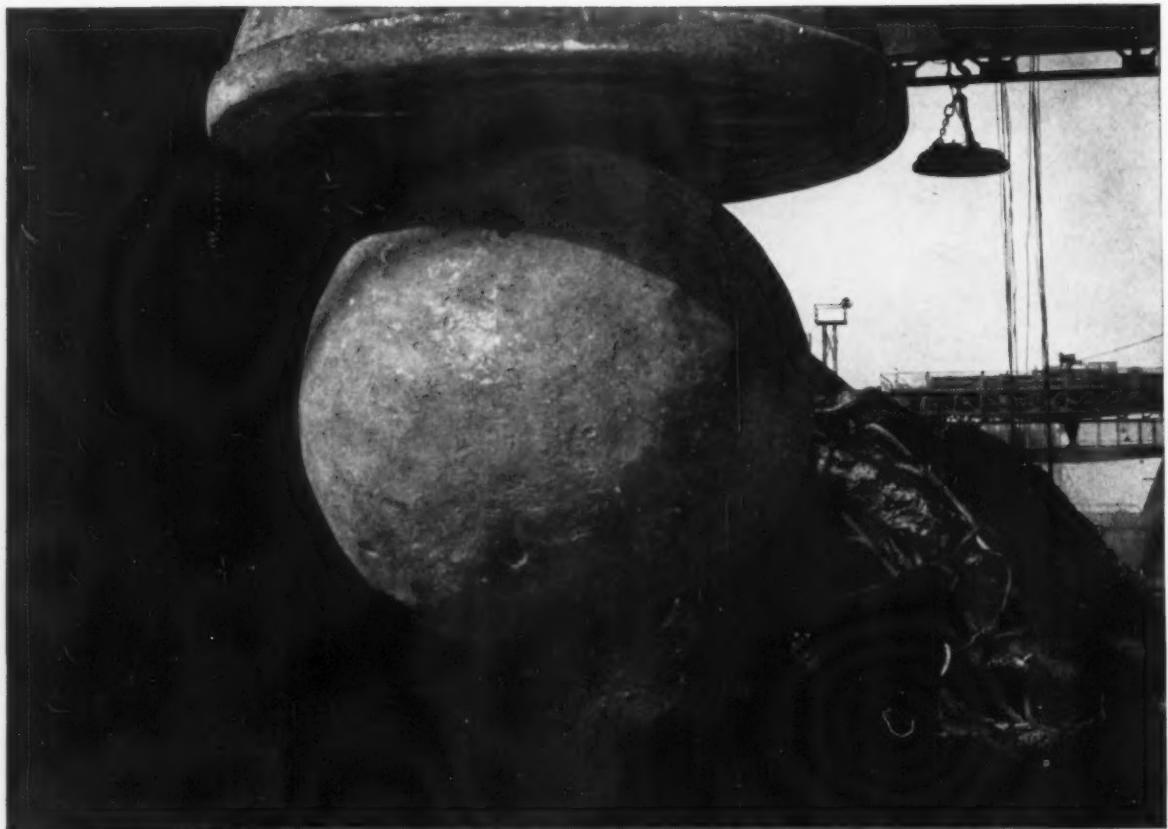


THE *Portage* MACHINE CO.

1035 Sweitzer Avenue • Akron 11, Ohio

Representatives in Principal Cities

BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916



Smashing scrap since 1953 . . . this 48" diameter, 16,770-lb. Ni-Hard drop ball is still going strong. Pays maximum return per dollar invested. High hardness helps lengthen its life.

In addition, it is tougher than this hardness indicates. That's why it withstands the shock of jolts against scrap. Produced by United Engineering & Foundry Co., Pittsburgh, Pa.

Ni-Hard ball outlasts others by 3 to 1 ...breaks 27,000 tons of scrap and still on job

A Ni-Hard* drop ball earns you money because its resistance to abrasion greatly increases its life. Look at this one, for example . . . on an open hearth scrap drop at United States Steel Corporation's Youngstown District Works.

The ball looks battered, with one side slightly flattened out . . . but it should be after the service it has already given:

This Ni-Hard ball has broken up some 25 tons of scrap a day, seven days a week for more than three years.

Balls made of other materials averaged only 13½ months in the same service. Yet after 40 months the Ni-Hard ball is still in use. As a result of its unmatched resistance to abrasion, it still retains its working weight.

You'll profit by using a ball that stays hefty longer as it breaks up your scrap. So specify your next drop ball in Ni-Hard nickel-chromium white

iron. A list of authorized producers is yours for the asking. Write for it now.

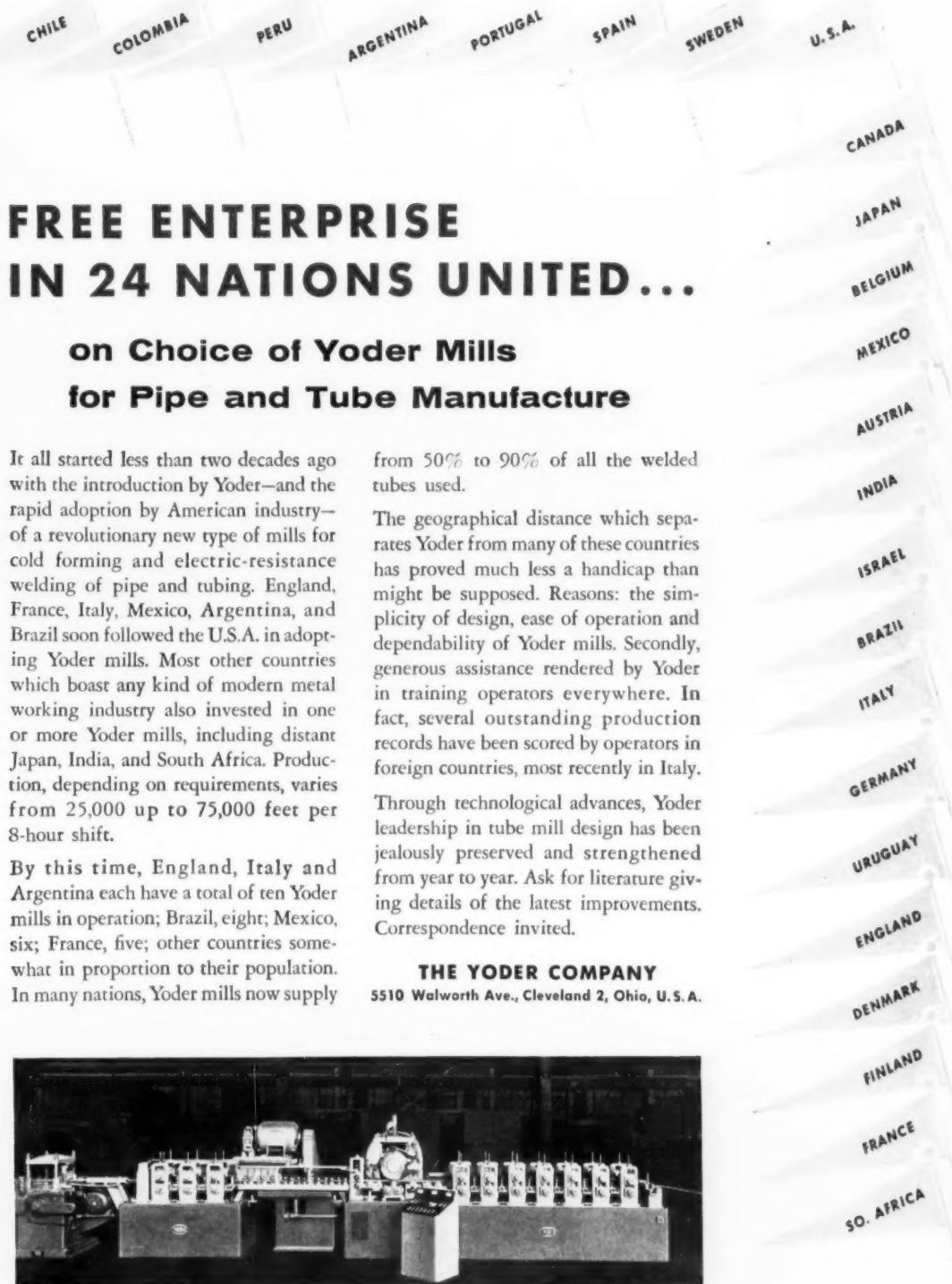
*Registered Trademark



Ni-Hard drop balls come in various sizes, and applications include fragmentation in reclaiming steel scrap from slag, breaking up cast iron scrap, powdering rock and the like. These drop balls were cast by United Engineering & Foundry Company.



THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street
New York 5, N.Y.



FREE ENTERPRISE IN 24 NATIONS UNITED...

on Choice of Yoder Mills for Pipe and Tube Manufacture

It all started less than two decades ago with the introduction by Yoder—and the rapid adoption by American industry—of a revolutionary new type of mills for cold forming and electric-resistance welding of pipe and tubing. England, France, Italy, Mexico, Argentina, and Brazil soon followed the U.S.A. in adopting Yoder mills. Most other countries which boast any kind of modern metal working industry also invested in one or more Yoder mills, including distant Japan, India, and South Africa. Production, depending on requirements, varies from 25,000 up to 75,000 feet per 8-hour shift.

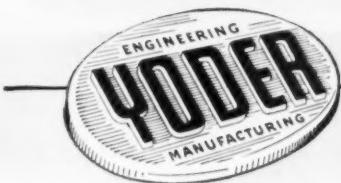
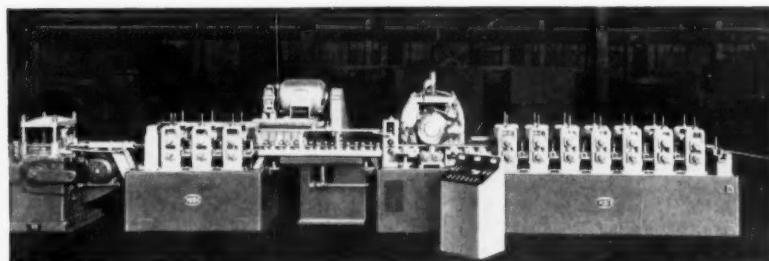
By this time, England, Italy and Argentina each have a total of ten Yoder mills in operation; Brazil, eight; Mexico, six; France, five; other countries somewhat in proportion to their population. In many nations, Yoder mills now supply

from 50% to 90% of all the welded tubes used.

The geographical distance which separates Yoder from many of these countries has proved much less a handicap than might be supposed. Reasons: the simplicity of design, ease of operation and dependability of Yoder mills. Secondly, generous assistance rendered by Yoder in training operators everywhere. In fact, several outstanding production records have been scored by operators in foreign countries, most recently in Italy.

Through technological advances, Yoder leadership in tube mill design has been jealously preserved and strengthened from year to year. Ask for literature giving details of the latest improvements. Correspondence invited.

THE YODER COMPANY
5510 Walworth Ave., Cleveland 2, Ohio, U.S.A.



PIPE AND TUBE MILLS—Electric Weld
ROTARY SLITTING LINES
COLD ROLL FORMING MACHINES

As the new Spring comes in again so does *your Old Friend...*



Golden-yellow is one of the bright colors of spring . . . and one of the bright banners, too, in the spring market-place. For this is the color of Brass . . . bright, cheerful, faithful Brass . . . spring and summer servant in a thousand ways in which no other material can serve as well.

Yes, Brass lasts, and lasts . . . far *outlasts* any of its substitutes or imitators. So when you go to buy fishing tackle, garden gadgetry, boat gear, and other outdoor oddments, be sure they're solid Brass. *For then you'll get your money's worth.* And we'll know, too, that when you buy top-quality products, you're bound to buy a lot of good, solid Bristol Brass . . . *than which there is none better.*

And if you fabricate these, or any other products which can use Brass . . . then let us show you what Bristol Brass mill products can do to help your sales. Write.

The Bristol Brass Corporation

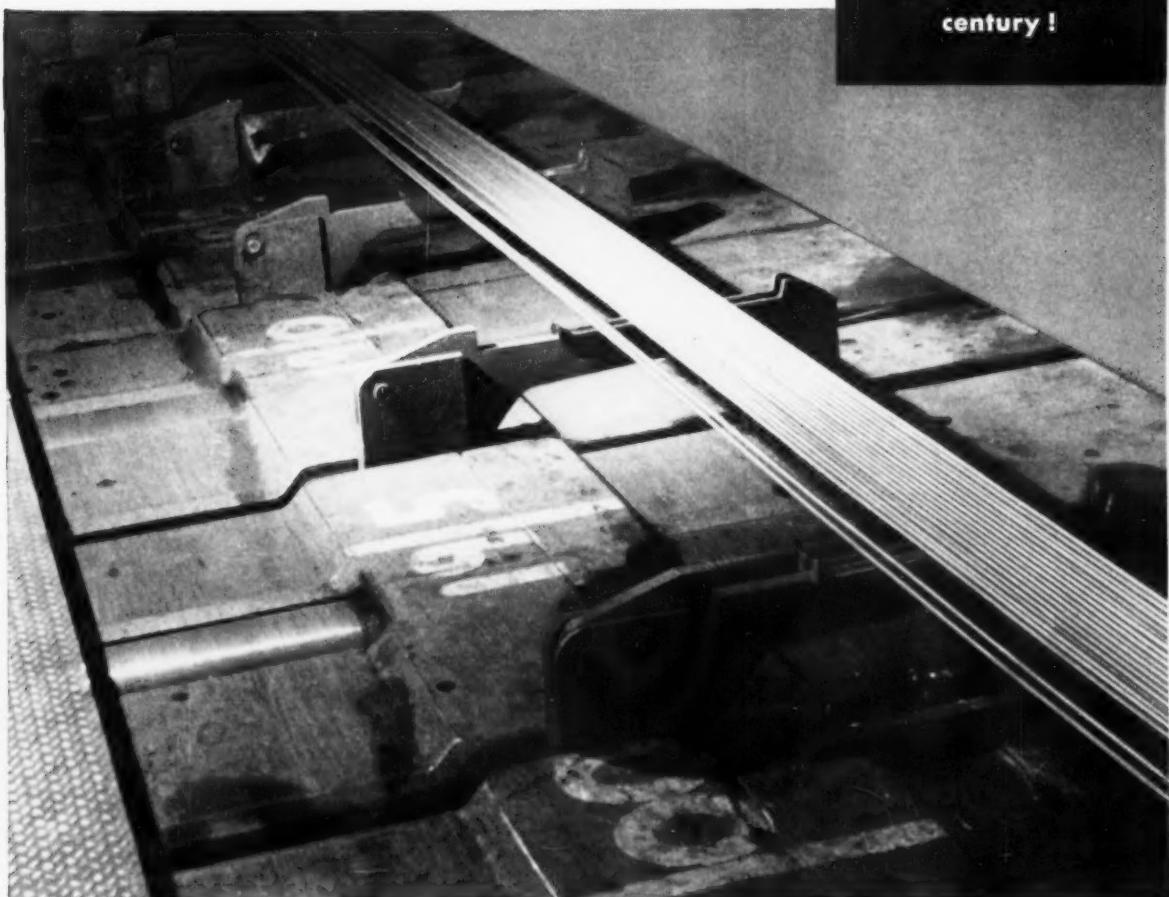
has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester, Syracuse. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton



"*Bristol-Fashion*" means **Brass at its Best**

**for more automatic
transfer and handling
. . . look to **BIRDSBORO****

Designers
and Builders
of Better Steel
Mill Machinery
for over half a
century !



- Birdsboro-built Cooling Bed Shear Approach Table Transfer, showing shuffle bars, double shear approach table and transfer that feeds double cold bar shear simultaneously. Transfer passes lift of bars from shuffle bars to second table without interfering with bars on first table.

MM-34-54

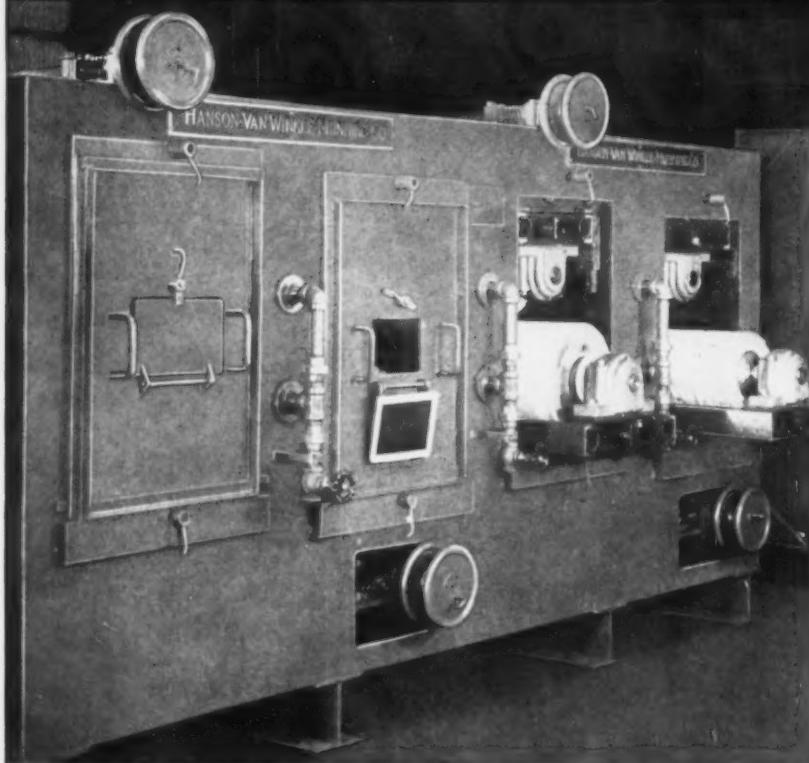
BIRDSBORO STEEL FOUNDRY AND MACHINE CO.

BIRDSBORO, PA. District Office: Pittsburgh, Pa.

Engineering Subsidiary: Engineering Supervision Co., 120 W. 42nd St., New York 36, N.Y.

STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY •
SPECIAL MACHINERY • STEEL CASTINGS • "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

CONTINUOUS STRIP AND SHEET METAL PROCESSORS



H-VW-M Scrubber Unit. Brush units are pulled out for inspection. In a matter of minutes they could be replaced, if necessary with new brushes.

cut cleaning time to a fraction with this automatic H-VW-M SCRUBBER UNIT

...and no down time either! Brushes are replaced easily while unit is in operation!

H-VW-M Scrubber Units—which adapt to fit into any system—are equipped with an exclusive, patented device that permits replacement of brushes *while the unit is running*. Just turn a few bolts, slide worn brush out, and insert replacement. Not a moment's production time is lost!

Add the advantages of this remarkable new feature to the enormous savings you'll realize in cleaning, reworking and inspection time, and you'll see why the rugged, efficient H-VW-M Scrubber Unit has no equal.

Get more facts about H-VW-M Scrubbers, with their exclusive easy-brush-replacement feature, by writing today for Bulletin HB-100.

Hanson-Van Winkle-Munning Co., Matawan, New Jersey. Offices in principal cities.

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H-VW-M

Hanson-Van Winkle-Munning Company, Matawan, New Jersey. Offices in principal cities.

PLATEMANSHIP — Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.



"CLICK" lubrication starts
when your machines start!

ALEMITE OIL-MIST AUTOMATIC LUBRICATION

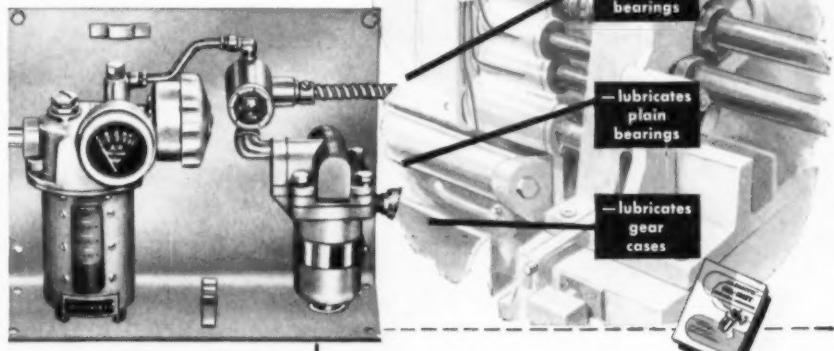
**provides constant, uniform,
foolproof lubrication—
at savings up to 90%!**

Alemite Oil-Mist atomizes oil into tiny, airborne particles that are distributed to bearings through tubing. It bathes all bearings with a cool film of clean oil . . . maintains uniform oil film regardless of variations in loads, temperature and speed. Simple, continuous, fully automatic. Eliminates the waste and uncertainties of the "human element" in lubrication. Uses up to 90% less lubricant than ordinary lubrication methods!

8 Advantages of the Alemite Oil-Mist System

1. **Continuous lubrication.** Deposits fresh, clean film of oil on all surfaces of all bearings.
2. **Fully automatic.** Starts and stops with operation of machine switch.
3. **No guesswork.** Bearings can't be overlooked, or over-lubricated!
4. **Reduction of bearing temperatures.** Acts as bearing coolant. Reduces bearing temperatures as much as 20°F.
5. **Fewer types of oil.** Reduces number of oils that must be stocked, handled and applied.
6. **Elimination of downtime.** All bearings are constantly lubricated while machines continue to operate.
7. **Extension of bearing life.** Life of grinding machine bearings have been extended from 400 to 7,000 hours!
8. **As high as 90% less oil consumption.** Usually consumes about 1/10th amount used by any other oiling method.

Mail coupon for Oil-Mist demonstration and information



Alemite Division of Stewart-Warner, Dept. H-37
1850 Diversey Parkway, Chicago 14, Illinois

- Please send me a FREE copy of your new and complete Oil-Mist catalog.
 Please have your Alemite Lubrication Representative arrange a no-obligation demonstration.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

ALEMITE

BEG. U. S. PAT. OFF.

Division of STEWART-WARNER CORPORATION



Here's how you can help make stainless plate

go a **LONG** way...

Whenever demand outdistances supply you have problems. But any problem can be solved when all hands cooperate. If you keep in mind these "rules of the road" you will be able to add extra mileage to the supply . . .

1. If you have a D.O. rating, give it to your supplier—it helps him get the necessary nickel, and protects your position on his schedule.
2. If you are going to cut plate into smaller pieces, give your supplier the option of furnishing small pieces.
3. Plan ahead as much as possible, so your supplier has a reasonable chance to meet your delivery requirements.
4. If an alternate analysis or a slight variation in gage is acceptable, let your supplier know.
5. Buy "cut-to-shape" pieces and reduce your time and costs of handling scrap.
6. Clean out your stainless scrap so that it can get back into production.
7. Order only what you need in stainless plate—to exact size.

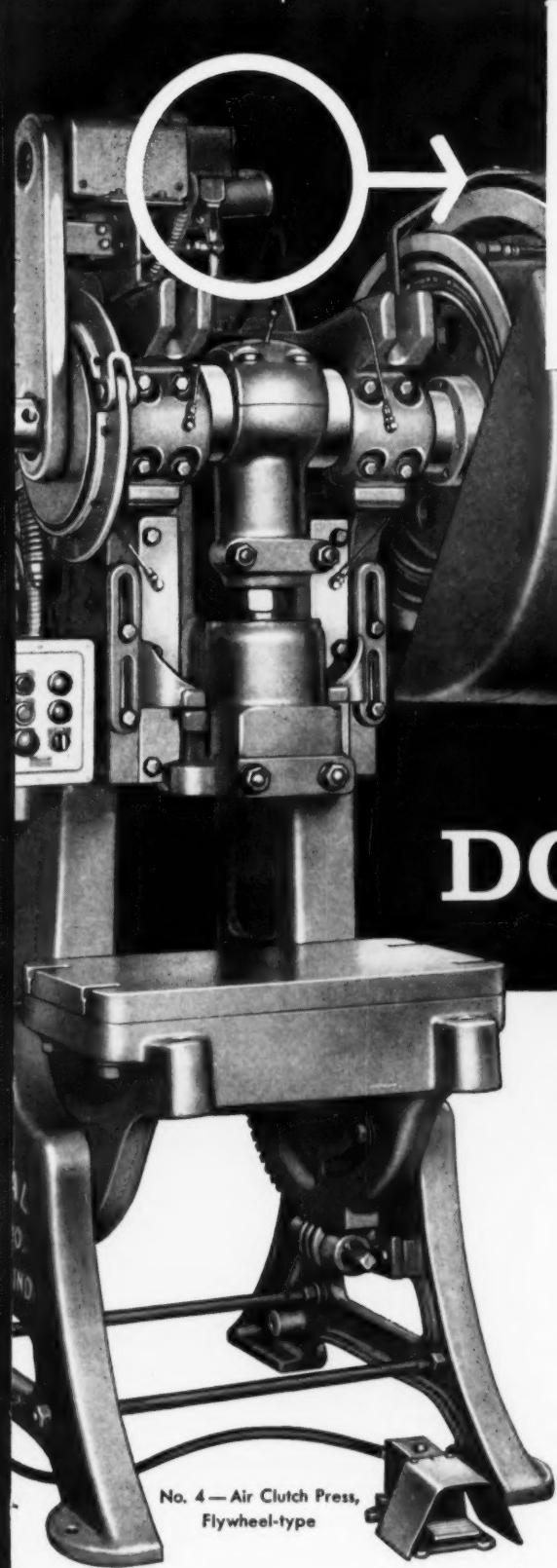
Put these simple rules to work . . . it will help you, and all of us, stretch the supply to the limit.

 **CARLSON, INC.**
Stainless Steels Exclusively

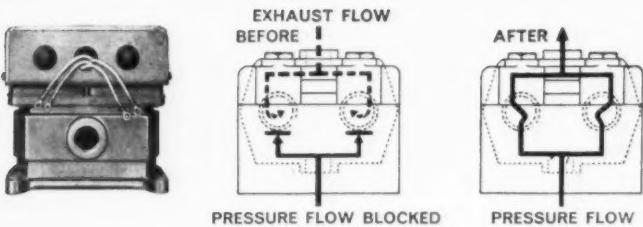
Plate • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

THORNDALE, PENNSYLVANIA

District Sales Offices in Principal Cities



No. 4—Air Clutch Press,
Flywheel-type



ACTUALLY TWO MASTER VALVES IN ONE—interlocked pneumatically with common inlet and outlet ports. Diagrams show pressure flow before and after solenoids are energized. For double safety, solenoid control keeps press from starting—or will cause it to stop "safe"—unless both valves work simultaneously.

This double-solenoid
safety valve makes
FEDERAL
air clutch presses
DOUBLY SAFE

Puts new GO in presswork!

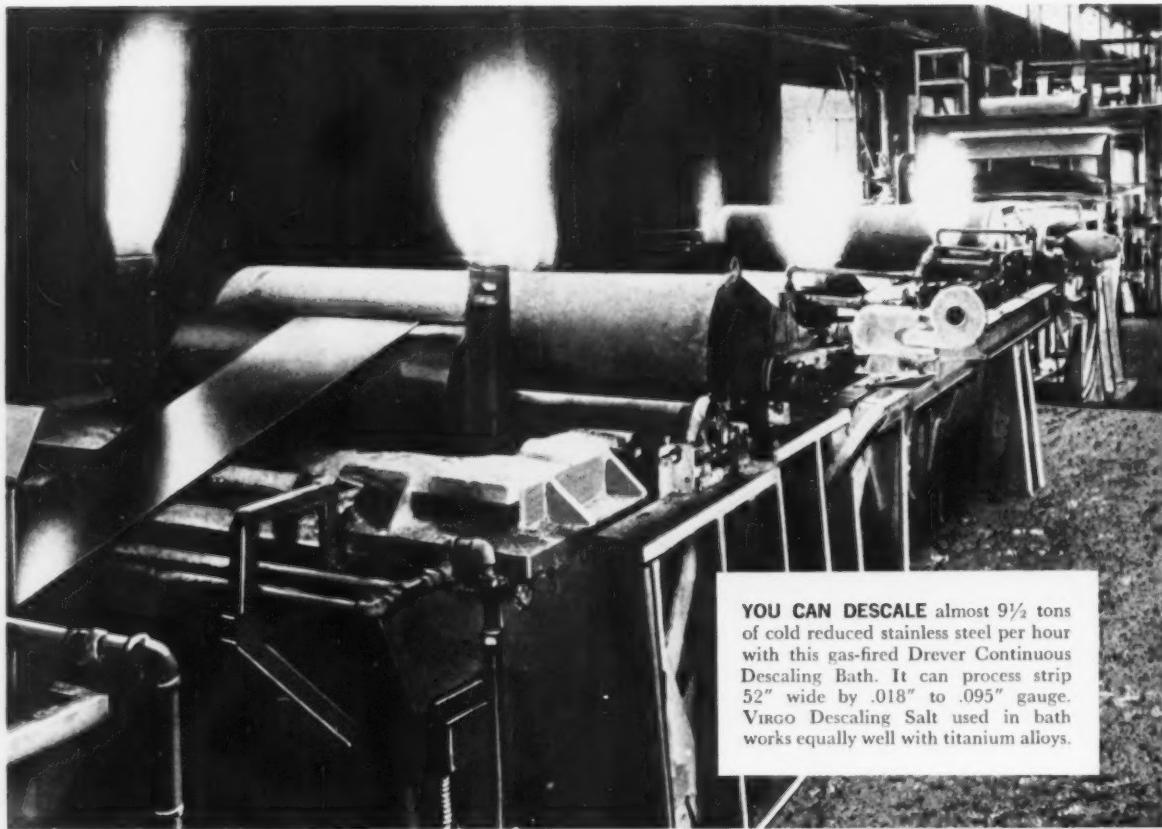
Here is the answer to faster, safer, more economical production: the new Federal Air Clutch Press with double-solenoid control. Speeds may be increased without damage to work, without sacrificing precision. For the dual control gives you the protection you want—makes "repeats" due to valve failure *practically impossible*. Also operation is simpler—less fatiguing. Press may be "inched"; single-tripped, or operated continuously. Available in sizes 6 to 100 tons. Prompt delivery on all models. Write for new catalog showing complete line.

FEDERAL PRESS COMPANY

702 Division Street, Elkhart, Indiana

FEDERAL *Open back
Inclinable* **PRESSES**

32 Years of Quality Construction



YOU CAN DESCALe almost 9½ tons of cold reduced stainless steel per hour with this gas-fired Drever Continuous Descaling Bath. It can process strip 52" wide by .018" to .095" gauge. Virgo Descaling Salt used in bath works equally well with titanium alloys.

VIRGO® SALT descales 18,700 lbs. of stainless strip in one hour

You, too, can accelerate your descaling speed to synchronize with production, when you use Virgo Descaling Salt.

Equally important are the economy and safety you get when you use Virgo.

Steel and titanium—one bath • You can descale both stainless steel and titanium alloys with the same salt bath.

Fast • The salt is so effective in making surface coatings acid-soluble, that you can remove the coating in one-tenth to one-hundredth the usual pickling time.

Safe for metals • Virgo Descaling Salt reacts only with scale—and with no loss of base metal. There is no danger of hydrogen embrittlement when descaling titanium.

Safe for personnel • The Virgo bath is simple and safe to operate when normal precautions are observed. Bath temperatures range from 800° to 1250°F., depending on the application.

Any form • Descale strip, sheet, bars, wire, tubes, or any other form to a chemically clean surface.

Acid disposal less of a problem • You can reduce the problems of spent acid disposal since the Virgo process decreases acid consumption.

To find out more specifically how VIRGO Descaling Salt gives you bright, clean surfaces—at speeds to match your production requirements—write for Bulletins 25 and 25-T, stating the application you are considering.

Help for your metal cleaning operations

Get the benefit of Hooker's basic chemical experience for your metal cleaning operations. Make Hooker your source for chemicals if you're:

Desanding • Use VIRGO Electrolytic Salt to remove sand, graphite, other impurities—produce a chemically clean surface.

Reclaiming parts loaded with carbon or rust • VIRGO Molten Cleaner works fast—is the quick answer for large-scale salvage operations.

Vapor degreasing • You get unique stability—decrease more parts between clean-outs—using NIALE® TRICHLORethylene with psp (permanent staying power).

Stripping, acid neutralizing • You can get Hooker caustic soda in four convenient flake sizes, in new easy-to-empty drums with 18" openings.

Acid cleaning, pickling • You can get Hooker muriatic acid in 4,000-, 6,000-, or 8,000-gallon tank cars.

Plating with tin-zinc, tin, silver, copper • Get the benefit of more than 50 years' experience in potash production, when you specify NIALE® caustic potash for your plating operations.

For literature on any of these Hooker Chemicals for metals, just write us on your business letterhead.

HOOKER ELECTROCHEMICAL COMPANY
303 UNION STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

HOOKER
CHEMICALS
PLASTICS



MCKay's PRESS FEED LINE

McKay's Press Feed or Cut-Up Line has rapidly gained acceptance wherever mass production of metal stampings is part of the manufacturing function. . . . From coil handling to automatic press feeding this line is the most successful yet developed. It uncoils, cleans, conditions and precisely measures the steel swiftly and economically. McKay engineers will show you one of these modern lines in operation at your earliest convenience.

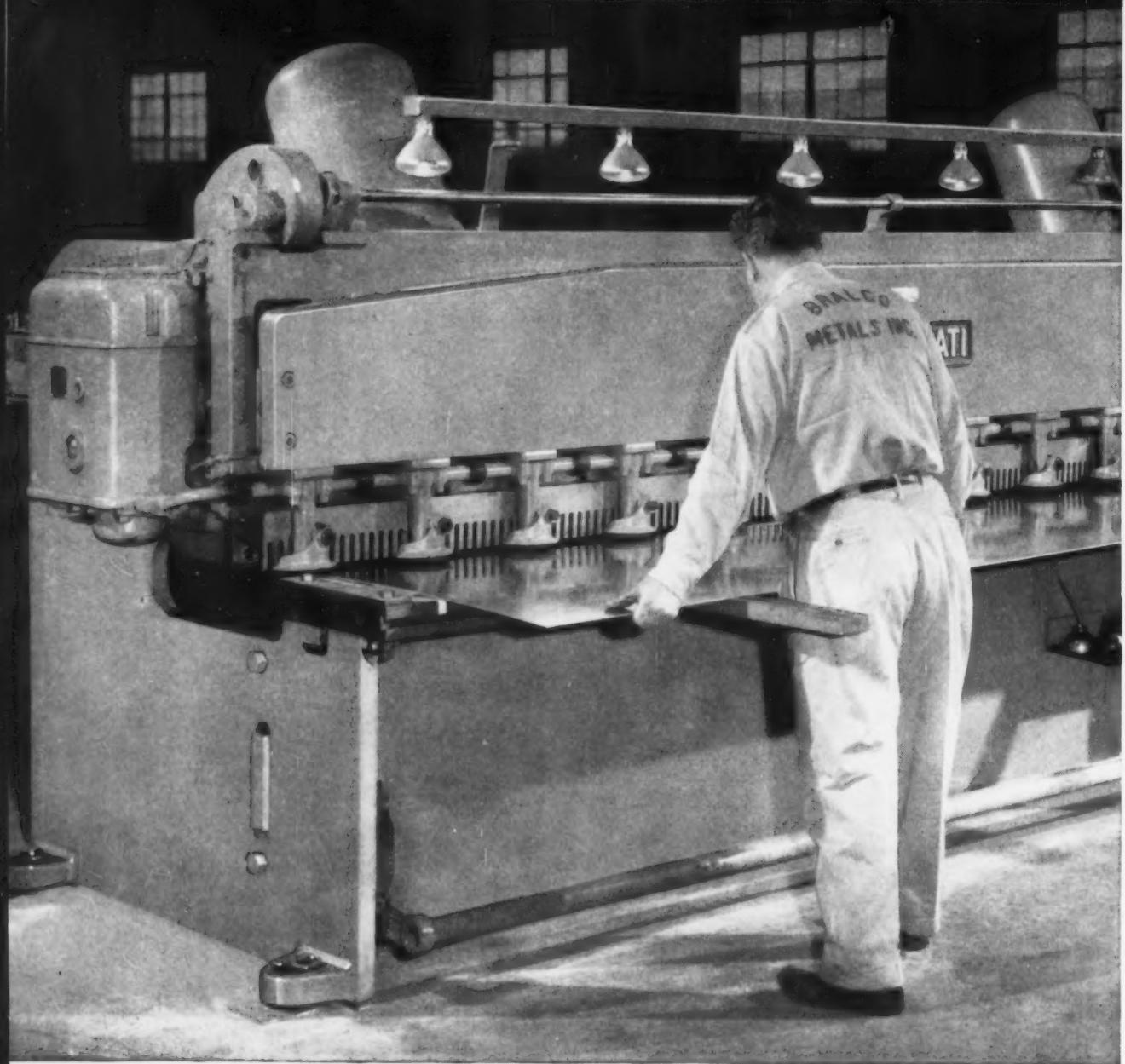
THE MCKAY MACHINE COMPANY
Youngstown, Ohio



SETTING THE STANDARDS OF QUALITY METAL
WORKING MACHINES FOR TWO GENERATIONS

10037

Accurate CINCINNATI



The 1412 Series Cincinnati Shear is shown shearing aluminum sheet. High pressure hydraulic holddowns automatically clamp different gauges of metal with the same pressure.



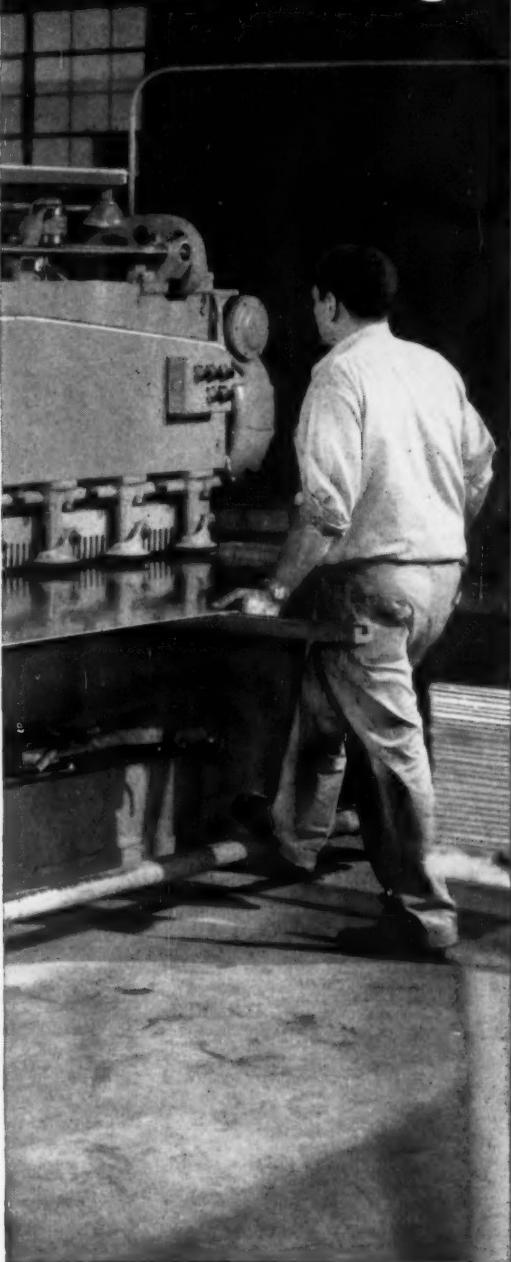
SHEAR brings

substantial increase in sales . . .

at **BRALCO METALS, INC., Los Angeles, California**

Micrometer accuracy in squaring, notching and slitting of aluminum sheet and plate makes this Cincinnati Shear a profitable producer. The Bralco Company states "There is no question that this Shear has been responsible for a substantial increase in our sales." Maintained accuracy is insured by hydraulic holddowns, low rake upper knife, inclined ram and all-steel, weld free construction.

Write **Department B** for Shear Catalog S-7R. We also suggest that you contact our Application Engineering Department for information on your shearing problems.



Photos courtesy Bralco Metals, Inc., Los Angeles 22, California.

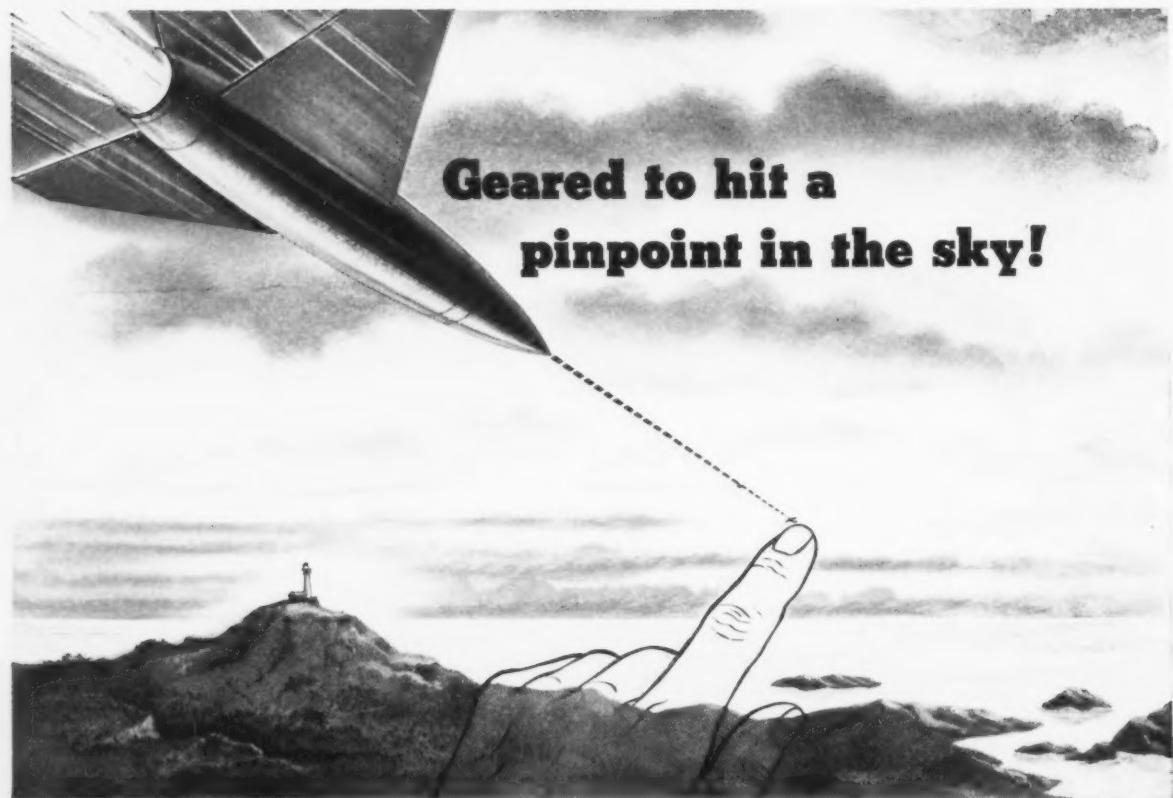
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



REG. U.S. PAT. OFF.

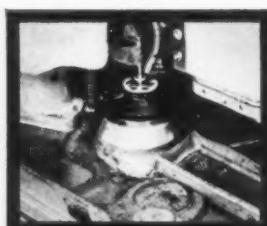


Geared to hit a pinpoint in the sky!

Research and development are constantly extending the range and speed of modern military aircraft and missiles, making higher and higher demands on countermeasures as well.

In designing counter-measure controls to the high degree of accuracy required for our air defense, engineers are specifying gears of greater and greater precision and gear trains whose combined errors are almost infinitesimal. In many plants, gears which meet these specifications are being turned out on *standard* Fellows equipment at a high rate of production.*

To combine extreme accuracy with high production rates, look to the complete Precision Line of Fellows gear production equipment. Fellows Gear Shapers are available in a full range of capacities from 1/16" to 120" P. D. Write, wire, or phone any Fellows office.



*For example, Hughes Aircraft makes up to 15,000 fine pitch gears per month with tooth-to-tooth composite error as small as 0.0003"...on standard Fellows equipment.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont

Branch Offices:

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150 West Pleasant Ave., Maywood, N.J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE
PRECISION
LINE

Fellows

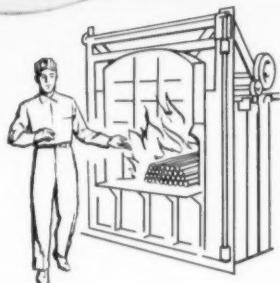
Gear Production Equipment

Stainless by Standard



ANNEALED

Full annealing is one reason why you get the maximum corrosion resistance in each foot of Standard pipe or tubing.



Standard Welded Stainless Pipe and Tubing is formed from only the finest strip steel with every emphasis on uniformity and quality. It is welded by the inert gas shielded arc process. No flux or filler metal is added. Then fully annealed to eliminate stresses and assure uniform structure and maximum resistance to corrosion.

Standard pipe and tubing is produced in a wide range of sizes and grades. Bring your stainless tubing problems to STANDARD . . . rest assured you'll get only the *highest* STANDARD in welded tubing and pipe.



Free 8-page folder on all Standard products. Write Address below.

STANDARD

THE STANDARD TUBE COMPANY
24400 PLYMOUTH ROAD • DETROIT 39, MICHIGAN

Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and heat exchanger
• Exclusive rigidized patterns • Special shapes • Steel Tubing—Sizes 1/2" OD to 5 1/2" OD—
.028 to .260 wall • Stainless Pipe—Schedule 40: 1/8" to 2" I.P.S.; Schedules 5 and 10: 1/8" to 4"
I.P.S.—Stainless Tube—1/4" to 4 3/4" OD—.025 to .165 wall

Heavy Cut-off Work Now Done with Band Sawing Economy



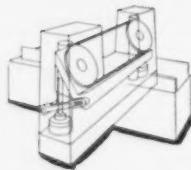
DoALL

POWER SAW

24" x 24" Capacity

HEAVY DUTY Horizontal CUT-OFF SAW

**New Design packs power, rigidity
and speed for the big cut-off jobs.**



HORIZONTAL SAWING HEAD

Unique design insures ample power and rigidity for new rugged beam 2" wide Demon HSS Saw Band.

You get heavy cuts at high speed, long band life at low tool cost.

FEATURES

- Finger tip control for instant response to change in speed or direction. (Manual control also available.)
- Powered rollers position the heaviest work pieces
- Fluid drive speed control meets broad range of cutting requirements.
- Automatic indexing table
- Power positioned hydraulic vises
- Automatic self-drain chip removal
- Positive feed coolant system

SEE DoALL—Booth 160
Western Metal Congress
Los Angeles—March 25-29



PS-5

Here's a machine that was designed *from the ground up* to meet a growing need by steel mills and warehouses, shipyards and other fabricators for high speed, dead accurate cut-off of heavy work pieces.

The new DoALL Power Saw Model 24 packs power, rigidity and speed behind a new rugged, continuous cutting 2" wide Demon HSS band. It will cut heavy bars, pipe, billets and structural shapes in a fraction of the time *at a fraction of the cost* of any cut-off machine of comparable capacity. And the narrow-kerf cut will give you a bonus of many more cuts per piece in material savings alone!

Its revolutionary horizontal design results in a combination of structural simplicity, speed and accuracy of cut with new ease of handling heavy work. Variable speed, fluid drive, complete automatic operation, automatic indexing of blanks up to 12' long, and power positioned hydraulic vises are just a few of the revolutionary time and money saving features of this new Power Saw. Call your local DoALL Sales-Service Store for details on this outstanding investment today or write: The DoALL Company, Des Plaines, Ill.

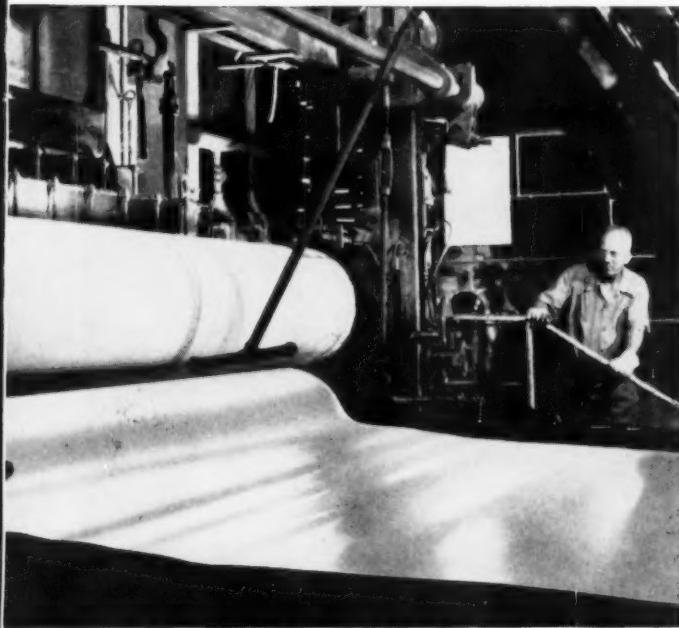
For Lowest Cost . . . do it on the DoALL!

Call Your **DoALL** Service-Store



NOTHING can equal Stainless Steel

in its unique combination of properties



For Heat Resistance

Pittsburgh Plate Glass Company wanted to increase the output of their glass tanks, so they needed better rolls to withstand the heat from the 2000° F. glass. They chose USS Stainless Steel Forgings for this critical location because Stainless resists cracking and oxidation, and retains its dimensions, even though in 24-hour-a-day service.

For Corrosion Resistance

Calera Mining Co. operates the world's largest cobalt refinery, and the process involves leaching with a sulfuric acid solution. The Stainless Steel agitators shown here hold up at temperatures as high as 200° F., despite the high acid concentrations.

For Durability

The nationally famous Norwalk Truck Lines have been using Stainless Steel trailers since 1941 and they've never had one wear out. Although the Stainless trailers cost a little more initially, Norwalk gladly pays the difference because the trailers never have to be painted, and they never rust out underneath.

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength, hardness, beauty, cleanability and easy fabrication. If you're looking for a reliable source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

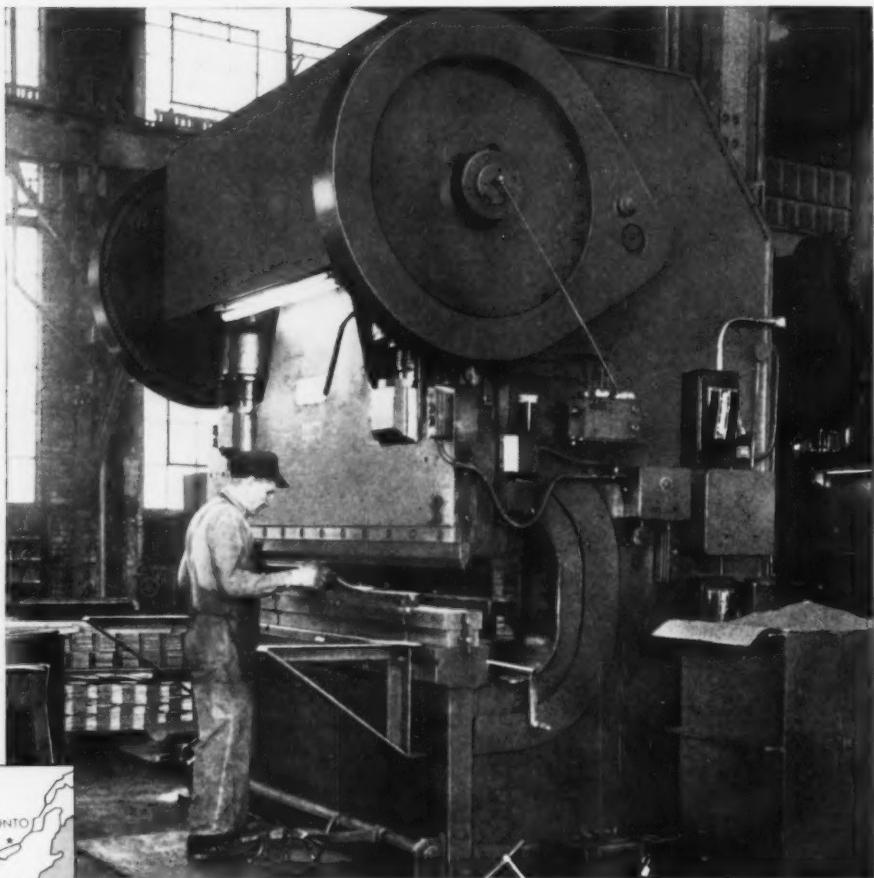
SHEETS • STRIP • PLATES • BARS • BILLETS
PIPE • TUBES • WIRE • SPECIAL SECTIONS



U N I T E D S T A T E S S T E E L



Installed in the Chicago plant in 1948, this 260 ton capacity machine, Model J4¹/₂-6, forms the smaller and lighter gauge conveyor panels. Illustrated is a curved section being formed of $\frac{3}{16}$ " plate to a radius of 8".



STEELWELDS Serve Link-Belt Plants From Coast-To-Coast

NINE LINK-BELT Company plants located from California to Pennsylvania, Texas to Ontario, Canada, and in Transvaal, South Africa, have one to six Steelweld Presses and Shears. Nearly every year since 1944 more Steelwelds have been purchased. Slightly over half of the machines are shears.

As a large manufacturer of a wide variety of conveying and processing equipment such as apron, screw, oscillating and overhead chain trolley conveyors, railroad car dumpers, bucket elevators and other handling equipment, Link-Belt

plants must shear and form a great amount of steel plate. From experience, Link-Belt has learned that Steelwelds are outstanding for this work.

There are several reasons for this. For instance, the accessibility of controls and ease of making adjustments. The all-around solid construction that permits continuous operation with hairline accuracy. The heavy, well designed machinery which requires minimum maintenance.

Like Link-Belt, when you really get to know Steelweld Bending Presses, you, too, will be elated with their performance.

GET THIS BOOK!
CATALOG No. 2010 gives
construction and engineering
details. Profusely illustrated.

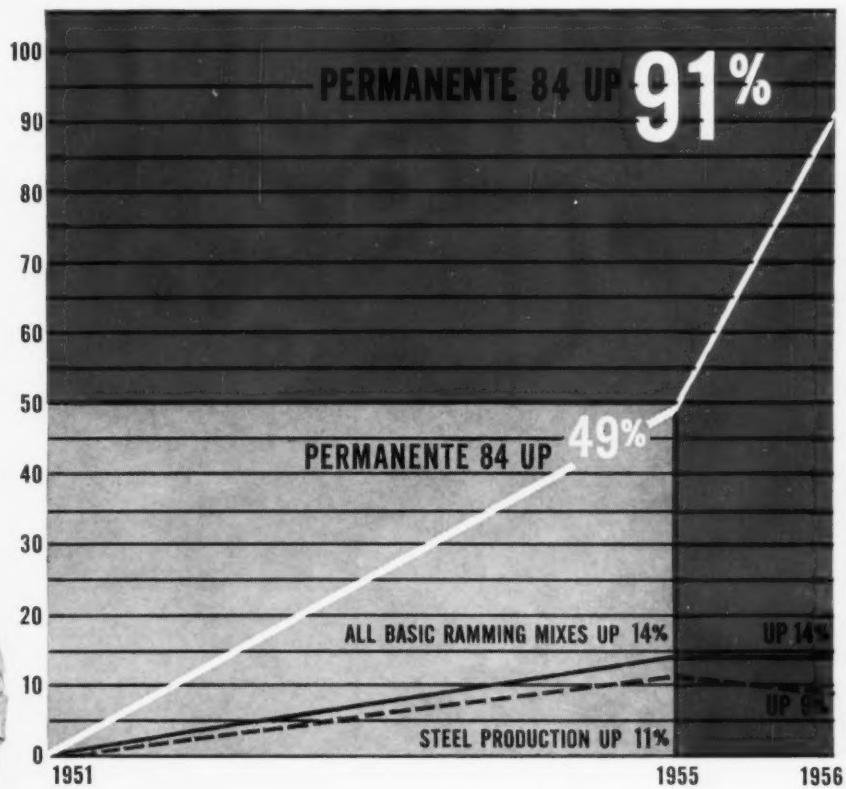


THE CLEVELAND CRANE & ENGINEERING CO.

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STEELWELD BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING



soaring Why this growing preference for Permanente 84 Ramming Mix?

A year ago, we ran an ad showing how sales of Permanente 84 to steel producers had increased 49% during the same 5-year period that sales of all basic ramming mixes increased only 14%.

But now after just one more year, steel producers' preference for Permanente 84 has pushed its sales increase up to a whopping 91%!

Why such an overwhelming preference? Briefly, here are the reasons:

Permanente 84 reduces the cost of maintaining furnace bottoms and

banks. Repairs made with Permanente 84 stay put! Down time for hot repairs is reduced. Steel production goes up—costs come down. Ideal for hot patching both open hearths and electric furnace banks and bottoms.

Order Permanente 84 now and get extra steel tonnage at lower cost.

Call or write Kaiser Chemicals Division, Dept. R7141, Kaiser Aluminum & Chemical Sales, Inc., at any of the addresses listed below:
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 HAMMOND, IND. 518 Calumet Building
 OAKLAND 12, CALIF. 1924 Broadway



Kaiser Chemicals

Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

The PRECISION GEARS which
Drive these Great Ships

were Finished on

RED RING
HORIZONTAL
SHAVING
MACHINES



S. S. United States

U. S. S. Nautilus



Courtesy, General Dynamics Corporation

U. S. S. Forrestal



Red Ring horizontal rotary shaving machines were used by Westinghouse Electric Corporation to finish the main propulsion gears of these great ships and many others.

Rotary Shaving assures precision in external and internal gears of all sizes. Write for information on your gear problems.



SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING
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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

The **FALK** all-steel Shaft Mounted Drive

- **Versatile**
- **Efficient**
- **Economical**
- **Compact**

**SIX SIZES— $\frac{1}{2}$ TO 30 HP—420 to 10 rpm—
single and two double reduction ratios—
output torque ratings up to 21,000 lb-in.**



To
Plant
Engineers:

The versatility of the Falk Shaft Mounted Drive makes it the practical choice for many machines in your plant.

This compact unit mounts on the driven shaft, thereby solving many problems of restricted space. You can obtain almost any output speed between 420 and 10 rpm by selecting the proper single or double reduction unit and the proper sheave or sprocket ratio.

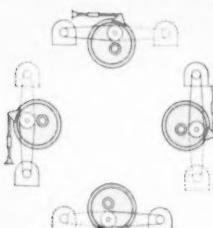
Do you need both horizontal and vertical drives? Standard Falk Shaft Mounted Drives are available for either application; or you can easily convert a horizontal unit to a vertical unit, right in your plant.

Initial cost is low, you get immediate delivery from shelf stock, and installation is quick and easy.

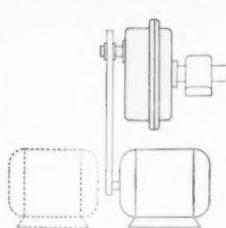
*

FALK Shaft Mounted Drives are available from factory and distributor stocks from coast to coast. See your Falk Representative or Distributor—or write direct for your copy of **Bulletin 7101**.

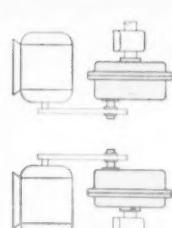
A few of the many ways this reducing unit can be applied—



ANY POSITION



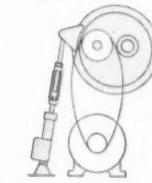
MOTOR EXTENDED
—or below the unit



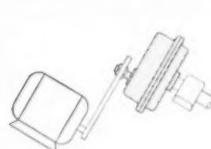
VERTICAL —UP or
DOWN



VARIABLE SPEEDS...
through use of variable-pitch sheaves—automatic belt adjustment with tie-rod adjustment



OVERLOAD RELEASE...
that will slacken belts and cut off power if overload occurs



INCLINED SHAFT...
Any standard unit can be mounted in vertical or inclined position by a simple rearrangement of oil drains

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FALK
...a good name in industry

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Epoxy Users
J. C. A.

March 25, 1957

If you have a dermatitis problem, we invite you to try our SUPER HARDENERS with EPOCAST Tooling Plastics. These hardeners have been specifically synthesized by Furane Plastics Inc. for use with EPOCAST Tooling Plastics. Furthermore, they make possible superior quality control in plastics tooling.

FURANE PLASTICS INC.

Rex D. Brookhart

Rex D. Brookhart
Sales Manager
Tooling Division

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that "NEEDED LIFT" can come from

You name the job or jobs to be done! We'll supply a crane or cranes that will do it. Standard Models in a wide range of styles, sizes and capacities will generally meet your requirements. If not, we'll engineer and build what you need. We've been doing it for more than 40 years.



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TO

"RAISE PROFITS"

GET A EUCLID PROPOSAL



In Capacities
from 2000 to
50,000 lbs.

EUCLID
SERIES H
HOISTS

EUCLID HOISTS are highly efficient and strictly modern in every detail with oversize anti-friction bearings and heat treated steel parts in combination with a welded frame.

The planetary gearing and mechanical load

for Details & Catalog, write

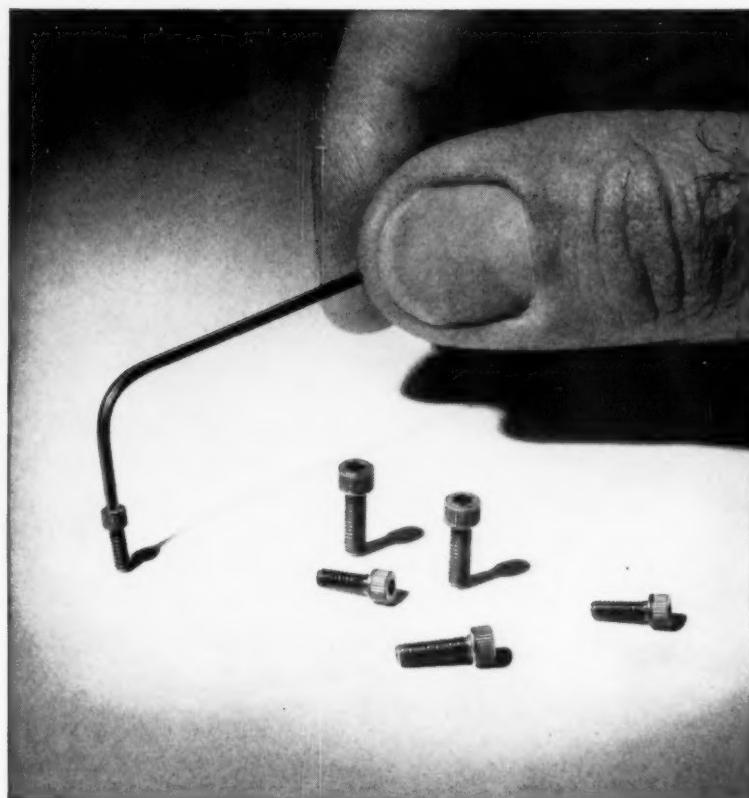
brake are mounted in oil tight housings. The hoist gearing is assembled in the hoist drum.

This design produces an unusual compact, rugged and accessible hoist readily adapted to various installations and types of control.

THE EUCLID CRANE & HOIST COMPANY

1361 CHARDON ROAD • CLEVELAND 17, OHIO

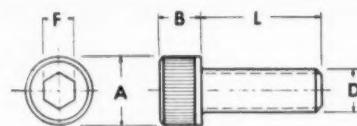
Miniature screws aid standardization of small devices



Standard UNBRAKO miniature socket head cap screws are available in sizes #0, #1, #2 and #3, in heat treated alloy steel or stainless steel, at your authorized industrial distributor's. Standard lengths range from $\frac{1}{8}$ to $\frac{1}{2}$ in.

HEAT-TREATED ALLOY STEEL

Class 3 Fit Standard



Diameter	Threads per Inch		Length	Recommended Installation Torque in Inch-Pounds		Weight per 1000 in Pounds
	NC	NF		NC	NF	
#0	A .104	80	$\frac{1}{8}$	2.0	.152	
	B .060	80	$\frac{3}{16}$	2.0	.182	
	D .060	80	$\frac{1}{4}$	2.0	.210	
	F .050	80	$\frac{3}{8}$	2.0	.265	
#1	A .118	72	$\frac{1}{8}$	3.5	.27	
	B .073	72	$\frac{3}{16}$	3.5	.32	
	D .073	72	$\frac{1}{4}$	3.5	.37	
	F .050	72	$\frac{3}{8}$	3.5	.47	
#2	A .140	56	$\frac{3}{16}$	6.0	.42	
	B .086	56	$\frac{1}{4}$	6.0	.50	
	D .086	56	$\frac{3}{8}$	6.0	.58	
	F $\frac{1}{16}$	56	$\frac{1}{2}$	6.0	.70	
#3	A .161	48	$\frac{3}{16}$	8.5	.59	
	B .099	48	$\frac{1}{4}$	8.5	.70	
	D .099	48	$\frac{3}{8}$	8.5	.81	
	F $\frac{5}{16}$	48	$\frac{1}{2}$	8.5	1.03	

Tiny close-tolerance Unbrako screws available in standard sizes

New economies in the design of space-saving miniature equipment are possible with these UNBRAKO miniature socket head cap screws. Manufactured to timepiece precision, available locally, they save the costly necessity of designing special screws to fasten tiny parts in compact units. They're ideal for use in typewriters, calculators and computers, servomechanisms, electric and electronic equipment—and in countless other small, intricate devices where maximum reduction in bulk and weight is required with no sacrifice in strength of individual components or assemblies.

Fingers grip the knurled heads on these tiny screws positively for easy handling and fast assembly. Uniform hex sockets assure maximum wrenching torque. Controlled fillets under the heads prevent shearing of the heads. Threads are fully formed for maximum strength and exact fit. Extremely accurate head diameters permit their use in countersunk holes, saving weight by reducing the length of the screw required and making flush designs possible.

These standard UNBRAKO miniature screws are available at your authorized industrial distributor's. See him today. Or write us for Bulletin 2055 and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

Standard Screws are threaded to the head. Special materials, lengths, and threaded lengths are available. One "High-Titan" UNBRAKO hex key is included with each package of 100 screws.

UNBRAKO
SOCKET SCREW DIVISION
STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN PENNSYLVANIA



need a special size?

Then Crucible is the place to go. You'll find a full assortment of special steels in every warehouse in Crucible's nationwide chain.

Deliveries are prompt — service dependable. For Crucible is *large enough to serve you — small enough to want to.*

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Los Angeles, California

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Crucible Steel Company of America

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Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Harrison • Indianapolis • Los Angeles • Milwaukee • New Haven • New York
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No order too large or too small!

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TRY
THIS TEST
ON YOUR
PRODUCT'S
LABEL

SCALD TEST EQUALS YEARS OF NORMAL WEAR

Put your product's label on a piece of the material of which the product is made and dip it into boiling water. Chances are that with time, the adhesive or the lettering will deteriorate, losing its effectiveness and sales appeal for your product. Not so with a patented Metal-Cal.

Metal-Cals resist even the accelerated heat and humidity of many years, as shown with the scald test above. This is because Metal-Cals are made of .003" anodized, dyed and etched aluminum foil.

Colors stay fast because they are etched right *into* the aluminum. Metal-Cal resists salt spray, weathering and abrasion too.

Find out today what Metal-Cal can do for your product.

Try the scald test today. See if your present label measures up to the permanent, long wearing beauty of a low cost Metal-Cal.

IF IT'S IMPORTANT, MAKE IT PERMANENT WITH A...

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METAL-CAL Dept. IA

Manufactured by C & H Supply Co.
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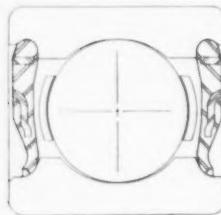
U. S. Patent 2,769,265

FACTS

about

NEW DEPARTURE

BALL BEARINGS



The diagram shows in section the New Departure Sentri-Seal. Lip-contacting surfaces are formed simultaneously with the ball race, giving an extremely high degree of concentricity between sealing surfaces and the raceway.

with

SENTRI-SEAL

on guard

against dirt and wear!



The unique design of the Sentri-Seal gives optimum protection against dirt, and includes a number of other major advantages.

Sentri-Seals can be removed, easily replaced. As the seal is of synthetic rubber in which two metal rings are embedded, a constant-rate spring is created between the rings. Inherent flexibility prevents distortion of the bearing outer ring due to seal insertion, permitting the use of bearings to the higher accuracy specifications. The spring action maintains an efficient sealing contact with the bearing ring to bar dirt and retain lubricant. Sentri-Seals are relatively inert to oils and greases and operate satisfactorily through a temperature range of -40°F. to 225°F. Specifications available for still higher temperatures. In applications where relubrication is desired, it is easily accomplished by the injection method.



SEE "WIDE WIDE WORLD" SUNDAYS—NBC-TV

Sentri-Seal is available for a range of sizes in single-row, standard-width bearings and also in two types of New Departure adapter bearings. Sizes, dimensions and capacities are listed in the latest New Departure catalog.

Write for full details on Sentri-Seal

BALL BEARINGS MAKE GOOD PRODUCTS BETTER

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

Superalloys Climbing

One authority estimates that the market for superalloys will double in the next five years. Same source figures this market today is more than five times greater than it was in 1951. Commercial use of jet aircraft will play an increasingly important part in future growth.

Chroming Doubles File Life

A new chrome-plating process is doubling and tripling shop life of files, drills and other small tools. Chrome-treated files (with 0.000050-in. coating; Rc 70-72 hardness) lasted an average 12-13 days on one application, as against standard files' 3-4 days. Users report freedom from clogging, considerably better rust resistance as other, processed-file advantages.

Tool Up for Gray Iron

Despite recurring rumors out of Detroit about gas turbine engines, free piston engines and aluminum engines, a major auto manufacturer has apparently decided they're not right around the corner. It is going ahead, tooling another engine plant for gray iron operations.

Mergers Go On

Rash of mergers and outright absorptions of smaller heating and air-conditioning producers seems set to continue. Reason: Heating equipment producers want air-conditioning line and vice versa. That way, they can offer residential, commercial-industrial users complete, year-round package of temperature control equipment. Trend is approaching proportions of appliance manufacturers' efforts, over past 5 years, to market complete lines of home appliances.

Labor's Wading In

Watch for steel labor drive to broaden industry-wide bargaining techniques. Happy with results in basic steel, United Steel Workers want to drive the wedge deeper, extend the technique to fabricat-

eating. Meanwhile, immediate union objectives are to get foot in door, in industry-wide bargaining, in aluminum, copper, pipe-valve fittings, foundries.

Uranium Firm Hedges

Though uranium ore has touched off one of the biggest mining booms in U. S. history, at least one uranium-mining firm is hedging its bets, and buying rights to iron-ore-bearing property. The iron ore lode, in the South, had previously been looked over by at least three steel producers. Where they failed to jump, the uranium firm is moving in to stake the claim.

New Research Tool

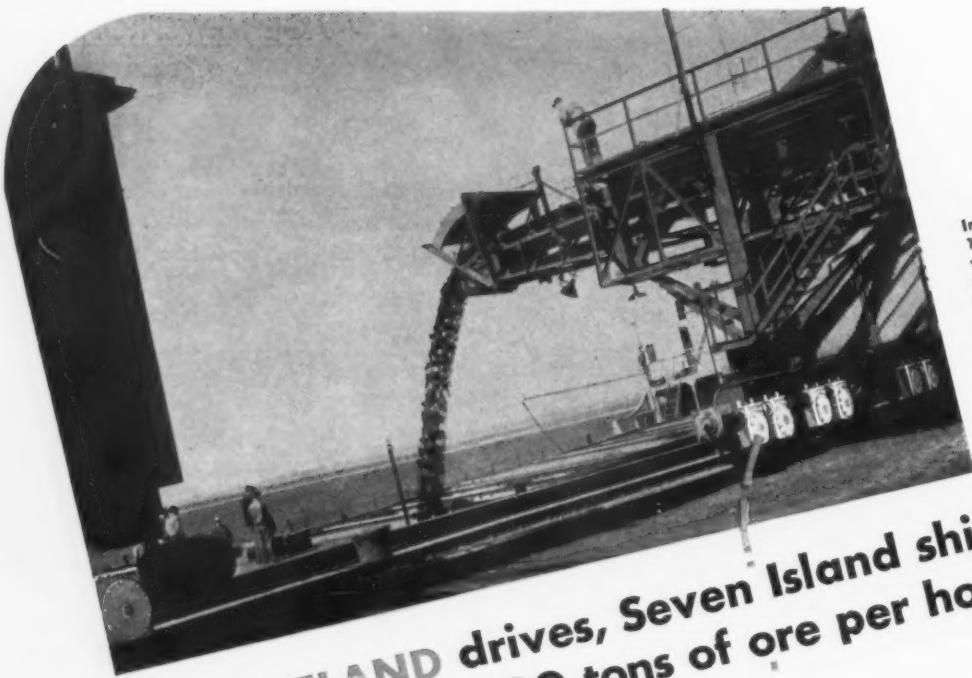
A field ion emission microscope, with magnifying power up to 5-million \times , permits viewing (and photographing) single atoms. Initial application for the Air Research & Development Command microscope showed individual atoms on the surface of tungsten. By making possible closer studies of films on metal surfaces, the instrument will aid in lubrication, corrosion, other studies.

New Zinc-Coating Findings

Expect more corrosion resistance from galvanized sheet in the not-too-distant future. Current research work is pinning down causes of brittleness in coatings; is pointed toward making even thick coating ductile enough to withstand severe forming. Thicker zinc coatings that won't crack or peel under deformation will protect steel longer.

Inventors Help Wanted

National Inventors Council wants free-lance inventors' ideas on how to solve nine "blue-sky" problems baffling armed services. Sample needs: (1) A portable, non-magnetic compass to find true north, independent of earth's magnetic field, (2) A radical method for unloading ships fast, either over-the-beach or dockside, (3) A new traction method for taking land vehicles over all terrain. Steel tracks chew up roads.



In service since July, 1954, these drives were manufactured by Cleveland's Canadian licensee, Peacock Bros. Ltd., with worm gear sets supplied from Cleveland.

With 32 CLEVELAND drives, Seven Island shiploaders can handle 8,000 tons of ore per hour

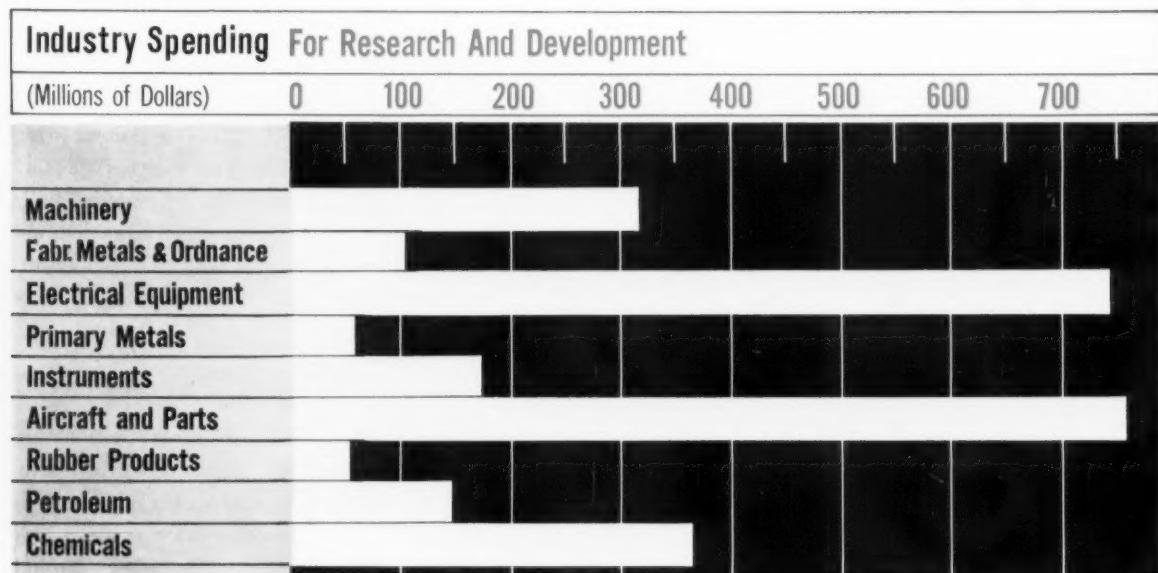
THIS monster shiploader and its twin each have an hourly rated capacity of 4,000 long tons. The two machines thus can load 12,000,000 tons or more during the normal shipping season.

Rich brownish-red iron ore from Labrador and Quebec promises to play an increasing part in supplying the steel mills of the Free World—and in loading every ton of it, Cleveland Worm Gear Speed Reducers have a part. In the photograph showing one of the loaders have a part. In you can glimpse seven of the 32 specially built Clevelands that are mounted in groups of four on the legs of the loaders. Through them power from the great steel frames carrying the belt conveyors for quick, accurate delivery of ore into the holds of waiting ships.

Whatever your power transmission job, there's a Cleveland to do it surely, safely, efficiently, economically. Write for Catalog 400. The Cleveland Worm & Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.





Source: National Science Foundation, Year, 1955.

Plan Ahead To Make Research Effort Pay Dividends

For Smaller Companies It's a Must

There's many a slip betwixt the cup and the lip in setting up a research program.

The rewards can be great but you must be geared to put results into action.

Here are some things to do and some pitfalls to stay clear of.—By C. Guy Suits.

■ It's important nowadays to have a research program. But without real planning, you might as well pour your money down the drain. This is especially true for the small company operating on a limited budget.

Once you decide that you need

research, the next big step is to determine what you want it to do for you. Then you figure how to go about it. Neither of these decisions is easy to reach. But a wrong move on either could be costly as well as frustrating.

What To Do—In our business, there's such a thing as research on research. We call it "an analysis of the technology underlying the products of the company." In a nutshell, it means "look before you leap." And oftentimes it pays to take a good long look.

Before you undertake a research program, here are some of the things you should do:

Make a rock bottom estimate of

potential savings in decreased costs or improved service.

Do the same in figuring your increased business through the competitive advantage a research finding might bring.

Figure the odds on success of the project.

And last, but not least, relate all of these to the cost of the needed research.

Do It Often—There's no short cut on either of these points. Either you do it, or you risk laying out good money with the odds against reaching your goal.

Moreover, this analysis is not something that is done just once. It must be repeated periodically



GUY SUITS

"Spend research dollars wisely."

Guy Suits is vice president and director of research for General Electric Co. His best known work has been in high-temperature, high-pressure electrical discharges.

During the war, he directed work aimed at protecting our bombers against radar anti-aircraft fire.

to make sure the research program is still on the beam. This is your stabilizer to keep the wheel in balance.

Plan Ahead—Now let's assume that you have a program underway and pointed in the right direction. What do you do while the research program is moving toward fruitful results?

Well, apart from keeping a close eye on developments, you must have a definite plan for putting the results to use. And this is not always as cut-and-dried as you might hope. Most research projects do not develop exactly as expected. Thus, it's important to be ready to improvise, as it were, to get a maximum return from the research effort.

To keep tabs on development

Should You DO or BUY?

- In planning a research program, an important decision for management is whether to hire a research staff or get the job done on the outside.

This question may come up in connection with any part or all of the company's research program.

IF YOU PLAN TO BUY

If the decision is to have it done outside, three main sources are available:

Producers and vendors of materials and components. Universities, through their science and engineering departments. Research institutes.

BE PREPARED TO ACT

But even if outside help is contracted for, the company must have on its staff technically qualified people to (1) determine areas of work, (2) to provide effective liaison with the research agency, (3) to evaluate

research results, and (4) to see that results are applied to the company's business.

SET YOUR OBJECTIVES

Establish your long-range and short-term goals. Be prepared to tie in your results with production and sales. If you can't put your results to work, the research effort is wasted.

MEASURE YOUR RESULTS

Although research results are sometimes difficult to evaluate, every company with a research program should develop some means of determining the value of what has been done.

This is particularly true where a company has embarked on a program for the development and production of a new or improved product. This, in turn, can be measured against management's original expectations.

of your program, it is necessary to make frequent reassessment to avoid lost motion. Frequently, this reappraisal will help you decide whether to discontinue certain projects, whether to shift emphasis, or start entirely new projects.

Tools For Research—In applied research, another valuable tool of growing importance to management is "research project appraisal." It brings into play a variety of techniques to aid in reaching a happy balance among the factors involved in evaluating specific projects as well as the over-all research program. These factors include: urgency of the goal, the required investment, the chances of success, the probable value of successful results, and an estimate of when pay dirt might be struck.

These tools are within reach of even small companies. It's not always necessary to have a large research staff on your own payroll. Outside consultants and research institutes can do a good job on a contract basis. Research institutes are in a position to guide both large and small companies. They have the talent, facilities, and flexibility needed to focus on a wide variety of problems.

What About Cost?—Another important question to ask yourself—and answer correctly—is: "How much money should I spend on research?" There's no point in hiding your head in the sand. Research must be paid for out of profits. Its justification depends upon the total impact of the research program upon company earnings. Re-

search directed toward new and improved products is an investment in future operations.

In short, you must decide how much of present profits should be invested in future business. Or what part of your sales dollar do you consider a profitable investment in research. To put it another way, how small a share can you afford to invest in your company's technological future?

The answers depend on a given company's operating and financial circumstances.

Know Your Business — Apart from strictly technical considerations, you should know your own business from every standpoint. You should know whether the business has good growth potential and whether this potential is limited by technology. Should you aim for product diversification by looking into existing knowledge, or should you explore new pathways?

Does your present product go out of date quickly? Is new product development in your business a time-consuming job or do new models appear on the market often? Is patent protection likely, or significant, in your product line?

Watch Pitfalls — It's well to remember, too, that to profit from your research you must be geared to produce the new product or the improved old one.

There's one more pitfall to avoid: don't expect your project engineer to carry on materials and processes development more or less as a spare-time activity. It won't work. Too often, the ever-present "fire fighting" brought on by production emergencies crowds new-product development into the background.

If you expect to get results, applied research aimed at new-product development must be formally established as a specific and separate activity of the technical staff.

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Big Job For Plastic Shell Model

It's tough to figure the stresses inside steel pressure vessel of a power reactor.

But plastic model enables Westinghouse engineers to "see" what happens.

■ A two-foot plastic model at the Westinghouse Research Laboratories is giving up some of the secrets of what happens inside the solid steel pressure vessel of a power-producing nuclear reactor.

Westinghouse scientists have found a way of duplicating the stresses that the steel shell is subjected to when the reactor is in operation. These pressures run as high as one ton per square inch.

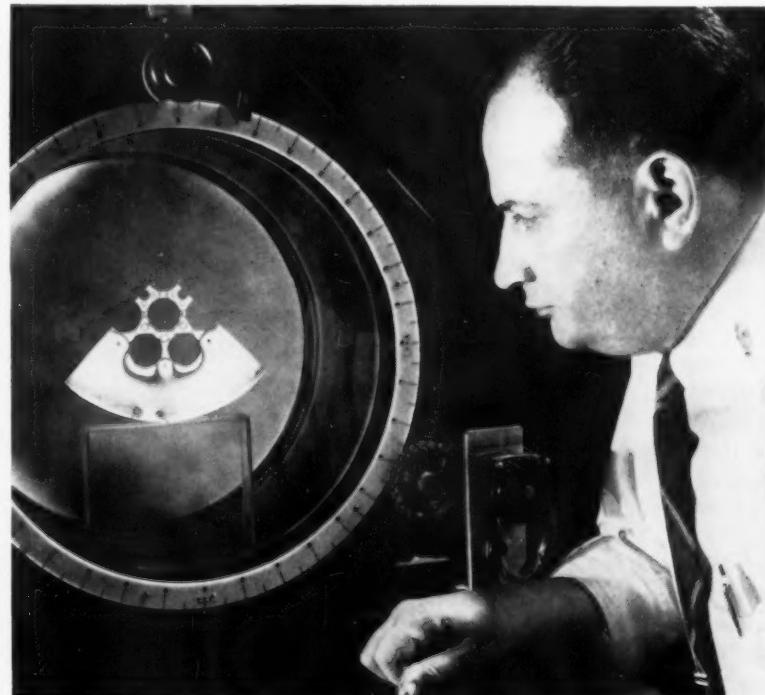
Dr. Clarence Zener, acting director of Westinghouse research, says the technique is to reproduce in the plastic model the exact stress patterns existing in the actual pres-

sure vessel under its working pressure.

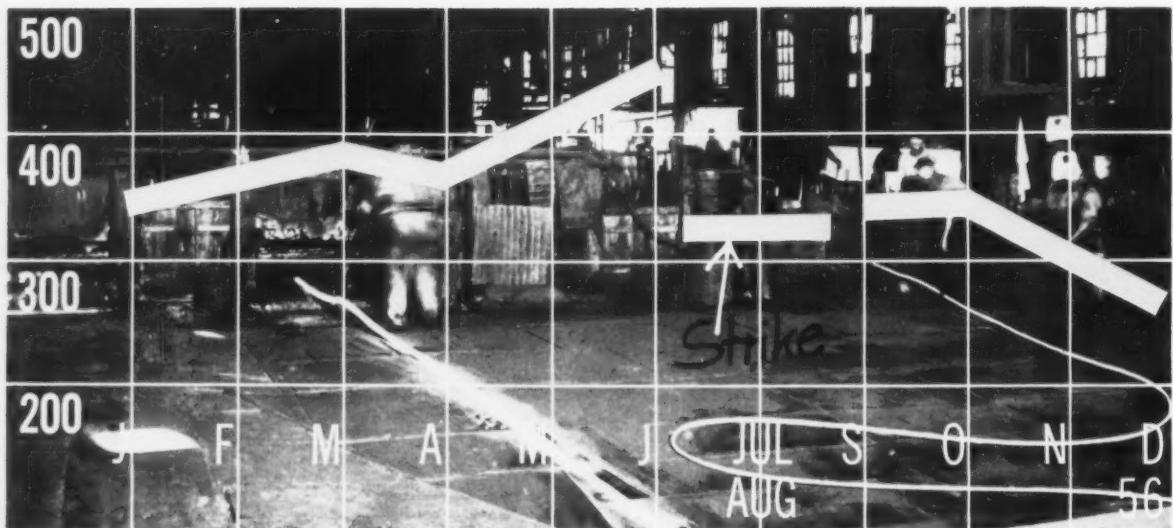
The special plastic used in the model has the ability to show visibly the twisting, bending, or other stresses created. Air is used to develop a pressure of about four pounds per square inch, which is enough to produce in the model the exact stress patterns generated in the actual pressure vessel when it's operating.

The model is then cured by heating, which "freezes" the stress patterns permanently in the wells of the model. Samples are then cut from the model and examined under polarized light. The "frozen" stresses can then be studied rapidly and with precision.

The work is under the direction of M. M. Leven, research scientist in the mechanics department of the Laboratories. The work will help speed pressure vessel design.



PATTERNS: Plastic duplicates stresses of nuclear power reactor shell.



Is a Comeback in Wire in Sight?

Shipments of Wire & Wire Products
(In Thousands of Tons)

Wire Market Feels New Strength

Wire is often called a barometer of the steel market. It is usually the first market to drop, sometimes leads the comeback.

Consumers have already completed cutbacks of wire inventories. New orders could indicate pattern for the steel industry.

Survey shows the outlook in regional markets for wire and wire products in months ahead.

- Will the wire producers be leading the parade of steel operations upwards this Fall?

Most steel market analysts making up short term forecasts see a decline of the steel operating rate into the 80's in the third quarter.

Wire producers, on the other hand, have already slipped to the low 80's. Yet there are straws in the wind which lead some industry economists to stick out their necks and predict strong third and fourth quarters with a continued upswing as the year closes.

Past Performance—The barometer held true in the 1954 inventory re-adjustment. In 1953 wire shipments declined ahead of general steel shipments. By the end of 1954 they had regained their quarterly rate from 842,000 tons back to over 1 million while general steel shipments were still declining.

These are some of the straws blowing around now:

In the general consumer durable goods which are a major part of wire markets, inventory reductions have been under way for several months. Consumer purchases started levelling off last fall. Finished goods on the shelf are now starting to move.

In the next two or three months the seasonal demand from the agricultural and construction markets will hit peak, thus lengthening present lead times for other wire. A probable price hike at mid-year will cause some hedge buying. And roadbuilding should push welded wire fabric well ahead of last year.

Left Behind—The contrast between the wire business and general

steel industry during 1956 has continued into this year. Increased plant and equipment expenditures plus another surge in shipbuilding, aircraft and railroad car building have largely bypassed wire producers.

For them, in sharp contrast, the big markets of residential and commercial building plus automotive have slowed down. Shortened lead times have liquidated inventories and intensified competition. Delivery promises and quality standards must be met these days. This adds up to wire customers' inventories almost liquidated while general steel customers have really only started working theirs down.

Beat 1956—To beef up the good outlook for wire, a nationwide direct purchaser survey indicates customers expect a strong rise starting the second quarter which will end up with 1957 equal to or better than last year. Almost all areas see present excess inventories being completely worked off in the next month or two to be followed by a buying upsurge.

Of all areas checked, New England and Kansas City customers are most optimistic. Cleveland, Chicago and Detroit consumers see improvements ahead, but not to the same degree. Automotive is the key.

In the New England area, fastener production is varying between 60 pct and 100 pct depending on what auto plant is being served. Finished goods now going out the door are made from steel accumulated since November and they are going out the door faster than raw materials are being purchased. Bankers are pressuring for low inventories to free tight money for more profitable investment. Tight money is also holding up some new construction and a severe winter cut down much actual work. A reversal of the overall market is expected in spring with 1957 ending ahead of last year.

Movement Starts — Along the eastern seaboard south of Philadelphia, finished consumer goods have started moving in last three weeks in an early spring surge. Shipments are ahead of production rates for the first time in months. A strong second quarter is in prospect.

Cleveland wire customers still have high inventories, especially among fastener producers. The rate of wire purchases is expected to remain at present depressed levels for another month or two—then an increase is seen. In total, manufacturers of wire products expect their total buys for this year to exceed last year.

Both Cleveland and Detroit markets hinge on how new autos sell.

Farm Belt—Chicago wire fabricators see a good farm demand for merchant wire products starting in early spring. 1956 was a poor farm trade year. 1957 should be much better although a slow start is anticipated.

Markets for cold heading wire have picked up slightly. In some cases it is at the expense of cold finished bar products as customers turn to cheaper methods.

Tinplate Users Go For Coils

Can companies' clamor for coils instead of sheets is more than a whim.

Some companies are rushing to changeover; others are taking their time.

But the trend has begun. It may mean the passing of an era for tinplate producers.

■ Tinplate producers are going through a curious changeover. This month, the Pittsburg, Calif., works of U. S. Steel's Columbia-Geneva Div., will begin shipping tinplate in coil form.

Shortly after, Tennessee Coal & Iron Div. will send out coiled tinplate from Fairfield, Ala. By the end of the year, all U. S. Steel tin mills will be equipped to supply tinplate in coils as well as strip. At least one other producer has scheduled March shipments of coiled tinplate. Experimental quantities have gone out already.

Some Are Cautious—This is not entirely a new development. Bethlehem Steel and Gary works of U. S. Steel have shipped tinplate coils before. Bethlehem regularly supplies both tinplate and blackplate in coils.

Moreover, the switch from sheets to coil is by no means universal among can makers. American Can Co. has taken the lead with a \$27 million program to process tinplate in continuous strips rather than precut sheets. Continental Can is moving in the same direction but at a more cautious pace. Other can makers are reported to be in the thinking stage; some have been using coils right along.

Heavier Coils—But recent moves show that both mills and can

makers are moving in earnest toward large scale use of coiled tinplate. One producer rates the switch among the more significant in steelmaking during recent years. He points out that mills will be supplying coils weighing 15,000 lb compared with tinplate coils in the past that ran about 5000 lb.

In addition, the mills face the problem of what to do about imperfections in coatings. When they are working with sheets, producers run tinplate under electronic eyes after plating. They lop off and segregate stretches that show flaws. With tinplate coming off continuous lines and going right into coils, it's hard to see how defective sections can be weeded out.

Few Are Worried—Despite the problems and despite an unmistakable trend toward coils for can making, some mills show little concern over the development, at least on the surface.

"It's simply a question of putting in a few coilers," they say. Others say they are doing nothing at the moment.

This apparent lack of excitement may be due to a lack of complete information. "We're playing it by ear," says one mill. "We know there will be changes and problems but we'll have to wait until we get into the thing before we'll know what's needed."

Another Aspect—the change hits different mills in different ways. Many must buy new equipment to handle the coiling operation.

In any case, the mills are being put to some bother for a move that will not add to the value of their product. However, there is one bright note: Tinplate does not appear to be losing out to blackplate in can making operations.

Put Idea Money Where It Counts

Tie a Fair Price Tag on Suggestions

If a janitor suggests cushioned seats for bench hands, what's it worth?

It's tough to place dollar value on an idea that might save a life.

Unfairness in dealing out cash awards can scuttle a program.

■ Suggestion men are stepping up their search for an answer to the question: How do you judge and reward bright ideas?

Recent moves include a general upgrading of awards and a trend toward more precise methods of judging intangible ideas. Both steps aim at putting the right dollar value on timely tips from employees.

Many Participate—The need for accuracy has become more pressing as suggestion programs snowball

into a multi-million dollar business. At last count, 256 out of every 1000 employees were putting in formal suggestions each year. From 5.6 million employees, 206 companies drew 1.4 million suggestions in 1955 (Statistical Report, National Assn. of Suggestion Systems).

Total awards jumped a fat 22.5 pct in 1955; average individual award rose 8 pct. All this activity is paying off handsomely. Direct savings from the suggestion program at one steel mill are running 8 pct over the cost of awards plus program administration.

Some Pitfalls—At the same time, suggestion programs can backfire hard. Tabulated awards this year will probably top \$12 million. This kind of cash can buy a lot of gripes, if distributed unfairly, and it isn't always easy to know what is fair.

A particular problem spot has been intangible ideas . . . those yielding no direct cash savings or savings that are hard to pinpoint. Suggestions on safety, comfort and other intangible matters make up about two-thirds of the total. They can be vitally important. One safety suggestion recently prevented a man's death and a \$30,000 claim in a forge shop. But intangible ideas carry no built-in price tag and there has been a tendency to dismiss or under-rate them.

One Workable System—To combat this situation, Detroit chapter of NASS made a survey some time back. They asked member companies in effect: What makes an intangible idea good? What factors should be considered in judging such an idea? On the basis of replies, weights were assigned to different factors and a method of evaluation was set up.

Weirton Steel Co. adopted this method last year in its Ideas for Improvement program. Weirton had the general problem of keeping awards up to snuff plus the need for consistent scoring in an operation that takes in 13,000 men, two separate works and various departments.

Points Add Up—Weirton set up a work sheet that listed six rating factors: effectiveness, seriousness, probability, extent, cost, and ingenuity. Each factor is weighted according to importance. For example, "effectiveness" is given a rating of .19. If an idea is considered 100 pct effective, it gets 19 points.

Points for all factors are totaled and the award is figured on basis of \$1 a point. Maximum point total or dollar value for an intangible idea is 100. Below 10 points, the idea is rejected.

In addition to setting fixed guide posts, this method provides a writ-

How Weirton Rated a Worker's Suggestion

SUGGESTION:

Place warning signs at service water outlets to protect workers against drinking contaminated water.

EFFECTIVENESS:

80 pct. Still some chance that someone might drink service water.

SERIOUSNESS:

Chances of illness from drinking contaminated water about 3 in 10.

PROBABILITY:

Would be infrequent that anyone might drink service water.

EXTENT:

About half the general area of the plant was affected.

COST:

Only cost was for signs, a relatively small factor.

INGENUITY:

Not a particularly ingenious suggestion. Use of signs is common practice.

EVALUATION:

Total point score based on six factors: 33. Per point value: \$1.00. Award: \$33.

Beware of Hidden Labor Costs

ten record of the reasons for giving an award. This is helpful because reluctance to reward intangible ideas has come partly from worries over future justification for approving officers.

Tangible Awards Easier—Since installation of the new method, Weirton has seen a marked increase in awards for intangible ideas. Coordinator C. B. Joslin reports \$6555 was paid employees in the last half of 1956 under the entire I.F.I. plan. Average award was \$69.74, or twice the national average.

In the area of tangible, or cost-reducing, suggestions, ground rules are fairly well staked out. Most companies figure awards as a percentage of net savings during the first year. Weirton Steel amortizes installation expense over a period of 20 years. The yearly installation charge, plus maintenance cost, is subtracted from gross savings to give the net return.

Net or Gross—Ten percent is a widely used award basis but the trend is toward larger slices. U. S. Steel's newly installed suggestion program calls for cost-reducing ideas to bring 20 pct of the first year's net saving. Maximum award is \$10,000.

Westinghouse Electric Corp., which recently awarded \$7786 for a single idea, pays 20 pct of the first year's net saving or 10 pct of the gross saving, whichever is greater.

Crucible Steel credits a suggestor with savings realized from any plant in which the idea is applied. Some large companies will limit credit to a single plant.

Those Who Oppose—Some union people resist suggestion programs on the grounds that new ideas may eliminate jobs.

Some supervisors will also drag their feet on suggestions. They feel a rash of suggestions gives the idea there is unhappiness and inefficiency in their departments. Program directors point out just the opposite is true. Lively suggestion activity is taken by management as a sign of good morale and interest within a department.

Not all labor costs appear in wages and fringe benefits.

Some hidden labor costs that don't even appear in the fine print can add greatly to your company's expenses.

Labor turnover also costs more than you might guess.

- Many an employer has negotiated what he thought was a reasonable labor contract, then found out to his sorrow that hidden costs or loopholes put his back to the wall.

Most managements are acutely aware of the current operating costs represented by direct wages and fringe benefits, concedes Dr. E. F. Scouten, vice president and director of industrial relations of the Maytag Co.

Fine Print—But many are not aware of less obvious costs, "which in the aggregate, oftentimes far surpass" these direct costs. Dr. Scouten made this point before a recent American Management Assn. labor relations session.

According to Dr. Scouten, "Such costs are created and magnified by ill-conceived provisions in your labor contract. With a little thought and attention, you can improve the quality of your labor contract so as to avoid the adoption of certain provisions which place such unwarranted restrictions upon management as to add very materially to this list of hidden operating costs."

A point to guard against is any provision of joint administration of time studies and labor standards.

Watchdog — "You just cannot

expect union or employee representative to participate in the establishment of rates of pay or incentive standards without . . . creating rates of pay and labor standards which are costlier than they ought to be or need to be," he warns.

Instead, management must get labor to accept the function of that of a "watch dog," to observe management's decisions and actions, then determine if provisions of the labor contract are violated.

Seniority provisions also provide loopholes for mushrooming labor costs, unless closely evaluated. A dangerous provision is "bumping," which permits an employee to bump another of less seniority.

Turnover Costs—Where can you find hidden labor costs? Some are not directly concerned with the labor contract itself.

For example, one large company estimates the total cost of labor turnover in its plants at more than \$500 a man.

"I don't suppose many of you (employers) granted a wage increase of 25¢ an hour last year," Dr. Scouten says. "But your turnover cost ran at that rate, whether you knew it or not."

Other hidden costs include slowdowns or controlled production, accidents and illnesses, absenteeism, excessive scrap, low morale.

Joint Administration—Although many companies have accepted joint responsibility for administering pension plans and other similar programs, Dr. Scouten says this "is almost automatically going to increase costs."

Freight Car Builders Hammer At Huge Order Backlogs

Record January output gets builders off to fast '57 start. But problems exist.

Steel shortage is easing slightly. Forged car wheels pose new headaches.

Shrewd "horsetrading" by some steel users is playing a big part.

■ Thundering down the tracks in pursuit of an order backlog of 114,656 freight cars, rail car manufacturers rolled 7822 new cars onto the nation's railroad system in January. It's something of an industry record. Steel and other shortages held output to an average of 5100 cars per month in 1956.

Railroad steel buyers are breathing a bit easier on steel—but not too deeply. As the director of purchases for one carbuilding firm put it, "Well, steel seems a little easier, but you'd have to use a microscope to spot the difference." The fact remains, carbuilders are moving up to a production level between 80 and 90 pct of capacity, compared with 50 pct a year ago.

Wheels Are Scarce—Part of the gain is due to increased use of strip mill light plate. Part is due to adroit trading of narrow width plate tonnages for plate in the wider widths, which is as scarce as ever. Part of the gain stems from expected second quarter allotment increases in overall steel tonnages. Incoming tonnages depending on the supplier, are expected to advance as much as 10 to 15 pct, with the result that some car and car component builders are cutting more deeply into their none-too-heavy inventories.

Steel buyers are still combing the woods for forged wheels. Cast steel wheels have been more readily



Freight Cars: Cutting the Backlogs

Thousands of Cars on Order and Undelivered.

available. Forged wheels dried up in early fourth quarter, 1956, when there were some indications that 1957 supplies were already booked solidly. This has eased slightly, but wheels and axles remain a problem.

Bookings Into 1958—Increased production of freight cars, and the decline in railroad profits in 1956 have not discouraged railroad buying. New orders in January hit 5328. Though the order backlog continues to decline—114,656 cars at the beginning of February as compared with 144,946 cars one

year ago—the ordering rate for both January and February ran well ahead of the 1818 cars ordered in January last year and the 1657 last February.

Though figures aren't available, most sources report a decline in Feb. 1957 inquiries and orders as compared with the whopping January figure. But with orders booked through all of 1957 and well into first quarter 1958, there seems to be little point in strong railroad ordering for delivery that is still one year away.

Ownership—The order backlog represents more than \$900,000,000 in railroad investment. The nation's railroads spent about \$1.3 billion on new equipment in 1956 and fully one-third of the sum went for cars delivered in that year. It's predicted that total expenditures will at least equal that amount in 1957. And a considerably greater portion will go for freight cars as they move from carbuilder yards at the rates attained in November, December and January.

In view of the current building rate, the strength of new ordering and the high railroad shipping forecast for first quarter, a handful of crystal ball devotees are beginning to speak of the first 80,000-plus car year since 1953. The railroads, they point out, are still not overburdened with cars.

Despite a 112,000 car year in 1948, a 92,993 car year in 1949, a 95,000 car year in 1951, a 78,000 car year in 1952, and an 81,000 car year in 1953—railroad ownership of freight cars was at a post World War II low in 1956. Railroads still need rolling stock and need it badly.

The carbuilders are catching up with the booming demand for their product, but it isn't easy. It's expected that current production rates will hold through the first quarter, and that car production rates will climb again during the spring season.

The fact is, however, that they already have climbed with a consequent push for more steel castings, wheels, shapes and plate as the second quarter opens.

Plan Stainless Plant

Universal-Cyclops Steel Corp., Bridgeville, Pa., intends to build a new stainless steel plant. An option has been taken on land near Coshocton, O., for this purpose.

Plans call for erection of a 30 in. wide stainless cold reduction mill with all necessary auxiliary finishing facilities. If all goes according to the present blueprint, the new facilities will be in operation by Jan. 1, 1959.

Aluminum Mills Get New Neighbors

Where you find a new aluminum plant, you'll probably find a big customer next door.

The reason: plenty of advantages in molten sales for both buyer and seller.

- When the next big aluminum reduction expansion is announced, look for a big customer to move in next door as a ready market for hot metal.

This doesn't happen often enough to be called a trend. But there are current examples to point to advantages for both producer and consumer.

Cast In Big Role—Latest instance is at Massena, N. Y., where General Motors will build a major casting plant next to a new Reynolds Metals plant. To be operated by the Chevrolet Div., the foundry will buy molten metal for casting of automotive parts.

Selling hot metal obviously pleases Reynolds. But the company says it is only the ultimate in a project it calls "synchronization." If it were not able to get a hot metal customer, it would try to convince any major user to build in the immediate area of a new reduction plant.

Having a ready market nearby makes financing a new plant easier. Freight savings are just as substantial. And the prospect of two new plants in an area usually results in more favorable concessions from local governments.

Others—Massena will be the third instance of Reynolds' reduction facilities being followed by a major automotive user of metal direct from the potlines.

The first is a foundry operated by GM's Fabricast Div. at the Reyn-

olds plant at Jones Mills, Ark., since 1950. Ford Motor is building a castings foundry near Reynolds' new 100,000-ton primary reduction works at Listerhill, Ala.

Economies of such an operation are obvious. At Massena, Reynolds will save the cost of casting ingots and shipping. Chevrolet will save the time and cost of remelting. And it will probably save something on its base price. Both will enjoy easier production scheduling.

Power Play—Underlying the trend is the growing use of aluminum for both functional and non-functional parts in the automotive industry. Some authorities speculate that an aluminum diecast engine block is not an impossibility. It is a challenge to aluminum researchers.

In the Massena case, Reynolds also benefited in an indirect, but important way. Prospect of the new GM plant in New York's St. Lawrence Seaway area had a lot to do with overcoming the political resistance to selling Reynolds the power. A main point of objection had been the low employment ratio compared with power requirements.

Power also played an important part in the establishment of the first automotive foundry within hot metal reach of Reynolds' Jones Mills plant.

Swap—In 1948 Buick needed aluminum (then in very short supply) for Dynaflow transmissions. Reynolds was approached when other sources failed GM. Reynolds needed more power to boost its total output. General Motors' Diesel Div. furnished gas diesels for Reynolds' Corpus Christi plant. Soon after, Reynolds began supplying molten metal from its Jones Mills, Ark., plant to a new GM foundry right next door.

Kennecott Is Making Titanium Bigger Part Of Its Business

Kennecott Copper Corp. is several steps deeper into titanium.

The copper company announced that Allied-Kennecott Titanium Corp., which it is forming with Allied Chemical & Dye Corp., will begin operations late in 1958.

And, Quebec Iron & Titanium Corp., of which Kennecott owns two-thirds, will spend \$16 million to up its output of titanium dioxide slag by 60 pct.

To Come—The new \$40 million company will produce titanium chloride, sponge, and billets. No site has been selected. But the two companies say several are being considered.

The board of directors will consist of three members of each of the parent companies. Representing Kennecott will be Charles R. Cox, president; William L. Walsh,

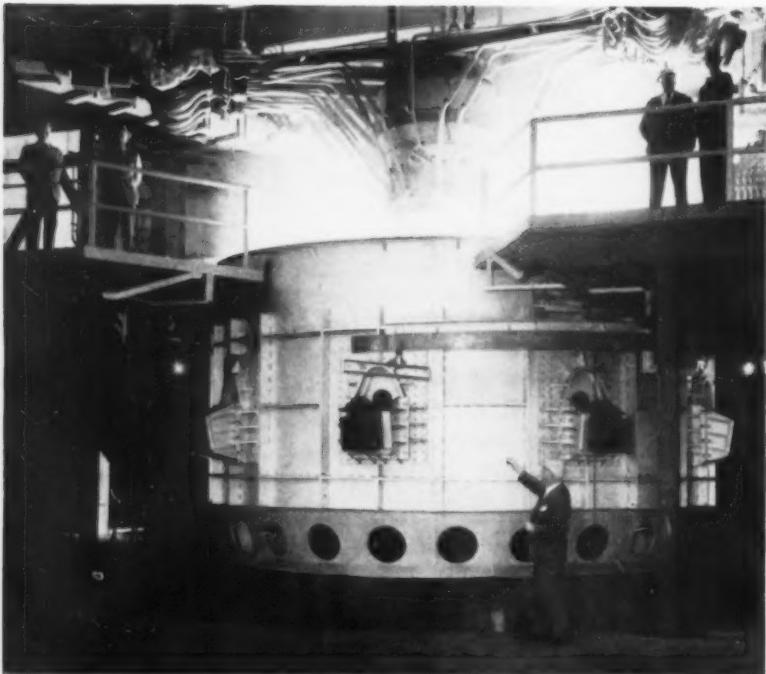
ass't to the president; and Frank W. Chambers, director of engineering. From Allied will be Carlton Bates, vice-president; I. H. Munro, head of Solvay Process Div.; and C. P. Hackett, development director for Solvay.

The companies also announced that production will be pegged on several Allied developments including a continuous process for making sponge, and a method of making titanium tetrachloride from titanium slag.

Fabricating will be based on new techniques for melting and forming, developed by Chase Brass & Copper Co., a Kennecott subsidiary.

Includes Furnaces—Quebec Iron & Titanium Co. will add three new furnaces and auxiliary equipment for the Sorel, Quebec processing plant. Also included in the project is a new dock and tower unloader, and a faster ore conveyor system. The entire expansion is scheduled for completion by the beginning of 1959.

It's the World's Biggest



FERROALLOYS: New furnace is called world's largest for ferroalloys. Pittsburgh Metallurgical Co. will charge the furnace with 300 tons of material daily. It will up Calvert City, Ky., plant output 25 pct.

Government Shifts Tax Write-off Program

On the tax front, this week the government slammed the door on fast tax write-offs for several industries, and widened it for one.

Added to the list of production goals considered accomplished are chromite (chemical grade), scientific instruments, selenium, manganese ore (battery and chemical grades), medical supplies and equipment, power facilities for military, atomic energy and defense related needs.

Fast tax write-offs and priorities for industries damaged in the flood of 1956 are due to end April 1.

On the other side of the ledger, qualifications for rapid tax amortization for oil and gas pipelines and storage facilities has been broadened to include "strategically located" civilian installations. This means projects near major ports or industrial centers may now get fast tax write-offs.

Previously only gas and oil facilities built solely for military or atomic energy commission facilities were eligible.

Modernize Foundry

Fletcher Foundry Div., The Fletcher Works, Philadelphia, has installed a new mobile sand slinger, sand preparator and a speed muller in an effort to speed up and modernize its grey iron foundry molding. Total project will cost about \$100,000.

Operation In Westbury

Servomechanisms, Inc., N. Y., has contracted with Brown and Matthews, N. Y., engineers and architects, for a new plant in Westbury, L. I. The structure will house engineering and administrative operations for the company's Eastern Subsystems Group.

The original layout will provide 55,000 sq ft of space. But curtain wall construction will allow for possible expansion to an additional 70,000 sq ft.

EC&M

55" MAGNET

HANDLES LIGHT SCRAP
AT LOWER COST

WEIGHS UP TO 25% LESS
WITH COMPARABLE
LIFTING CAPACITY

FASTER OPERATION OVER
WIDER WORKING RADIUS



This magnet, developed by EC&M engineers, is the lightest weight 55-inch magnet. High strength and water-tight construction are maintained with a completely **ALL-WELDED** design. Elimination of bolt-head recesses allows a better proportion for coil space, giving high lifting capacity. Welding also keeps pole shoes tight.

The companion EC&M lightweight 45-inch magnet has already become popular because its faster maneuverability and greater working radius permit more trips per day. The larger 55-inch magnet incorporates the same profitable advantages. Get the facts...see how these lightweight magnets can cut *your* light scrap handling costs.

Write for Bulletin 900-L



The companion
EC&M 45"Light-
weight Magnet,
now in wide use
on boom-cranes



THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
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7460

Air Conditioners Get Ready For Hot Weather

It looks like a record year for makers of home and plant air-conditioning equipment.

The present one per cent of factory space now air conditioned is going to mushroom.

Predicted market glut isn't likely to materialize as the trend progresses.

■ Regardless of the slump in home starts, air conditioning manufacturers say 1957 will be another record year for the industry.

From a \$3 billion gross in 1956, the figure will rise to \$3.5 billion in 1957. D. C. Minard, Trane Co. president, believes the greatest 1957 percentage gain in air conditioning

equipment installations will come from manufacturing plants.

At present, Trane believes, about one pct of U. S. factory space is air conditioned. A Trane study reports the trend is gaining ground most rapidly in the South, but that as early as 1960, 50 pct of all southern factories and 75 pct of new factories in the South will have some kind of air conditioning.

Everybody Happy—Sales reports from other manufacturers confirm Trane's optimism. Fedders-Quignan is predicting sales of 2 million room air conditioners in 1957. About 1,765,000 were installed in 1958, the industry's record year to date.

Cloud Wampler, board chairman for Carrier Corp., believes that 1957

will see central home air conditioning units approach the dollar volume of window or room units for the first time. Room air conditioners retailed for a total of \$485,375,000 in 1956. Mr. Wampler has said that by 1961 the industry will reach \$5 billion annually.

Best Guesses—Estimates of increased industry business for 1957 average about a 15 pct advance. Comments from Carrier, York, Trane, Worthinton, American Air Filter and other sources suggest that most equipment producers hope to beat that average.

Sales resistance from commercial and home air conditioning markets is cracking. This alone, industry spokesmen suggest, would provide a good year. Despite frequent reports that the home market for room or window air conditioning has been glutted by the more than 30 manufacturers who've entered that field, market researchers point out that less than 10 pct of the homes wired to handle an electrical air conditioner have been sold one.

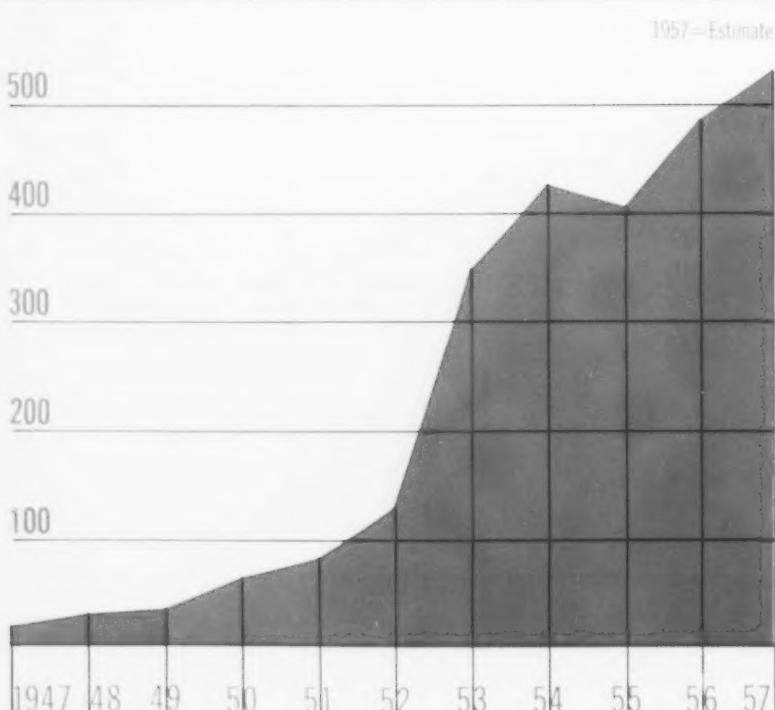
Hit the Plants—For the first time, however, a real drive will be made to sell plant owners on air conditioning. Some of ammunition that is being readied: Cost of air conditioning now is as low as \$64 per employee per year, or as high as \$264, depending on age of the plant.

The low figure includes both operating costs and cost of the unit on a 20-year amortization basis. Spot air conditioning is possible, where only troublesome areas of the plant need be air conditioned. Other portions of the plant can be cooled by means already in general use.

"Comfort cooling of factories" is the phrase used. The gains: Reduced turnover of skilled personnel, reduced absenteeism during the hot months, and higher productivity.

Boom In Room Air Conditioners

Retail Sales in Millions of Dollars



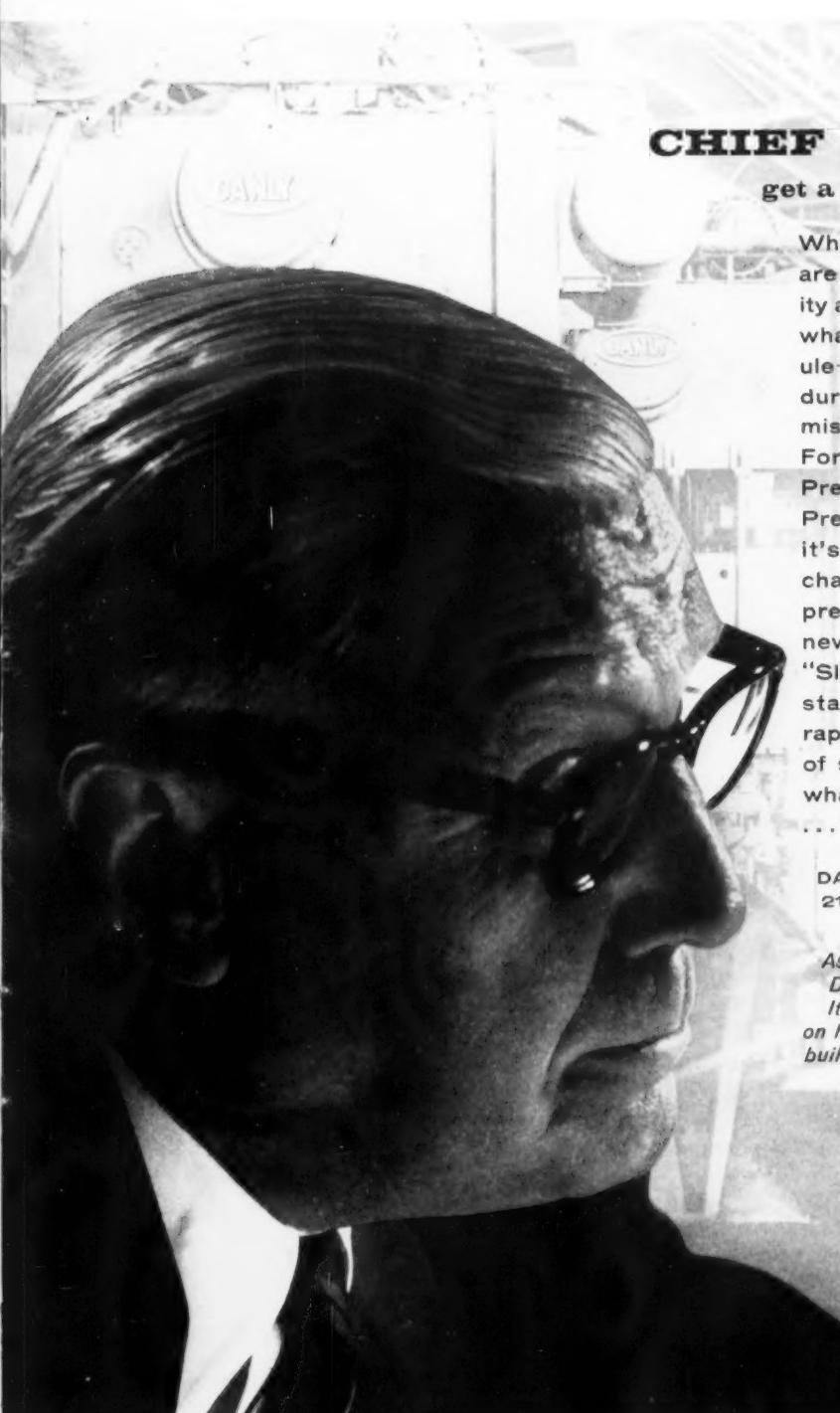
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DANLY

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get a jump on the competition



What do I look for? Presses that are able to perform at rated capacity around the clock because that's what it takes to meet a tight schedule—presses that won't break down during a run and cause the shop to miss an important shipping date. For my money, that means Danly Presses. Look at the time Danly Presses save in die changeover... it's almost as fast and easy as changing a tire, thanks to Danly's precision alignment. And Danly's new Microinching Drive gives us a "Slow motion picture" of each new stamping. It lets us set new dies rapidly and precisely... no danger of shearing or smashing. You get what you want with Danly Presses... they help you keep ahead.

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Ask for your copy of the
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It gives the whole story
on how Danly Presses are
built for you. Write today.



BRIDGEPORT BRASS

COPPER ALLOY BULLETIN



Reporting New Developments in Copper-Brass Alloys and Metalworking Methods

TIPS ON MACHINING DURONZE (ALUMINUM-SILICON BRONZE) ROD



by M. A. BUELL
Chief Staff Metallurgist

Our general designation for silicon bronze rod is Duronze. Duronze 707 is one of these alloys and contains 91.0% copper, 7.0% aluminum and 2.0% silicon. This composition makes Duronze a tough, strong and corrosion-resistant alloy suitable for a variety of applications, such as gears, pump parts, pinions, valve parts, etc.

It is this toughness which has to be considered when machining Duronze 707. Although the chip is brittle, its tensile strength is 50% greater than that of leaded brass. Consequently, extra machining power is required. Likewise, tools of a high degree of hardness, such as carbide-tipped tools, should be used. The tools should be set on center, or slightly below, to insure correct front clearance. Any rubbing will result in rapid wear to the tools. Above all, sharp tools are essential.

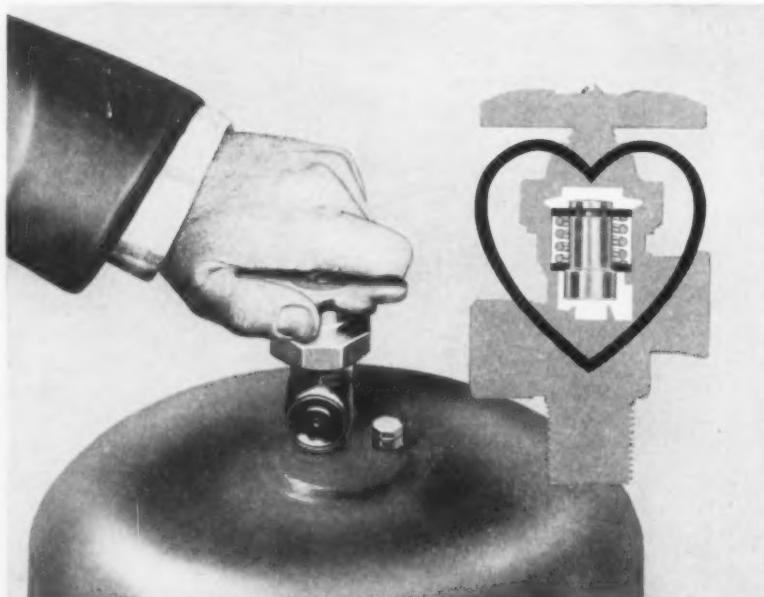
Cooling is most important when machining Duronze 707. The heat buildup, due to friction between the tool and the metal, is considerable. Consequently, the heat must be dissipated with a plentiful flow of coolant. A low-viscosity mineral oil of around 100 Saybold seconds is generally satisfactory. Sulphurized mineral oil can also be used but tends to stain.

Deep cuts should be avoided, but can be handled without trouble by splitting the operation into roughing cuts and finishing cuts. This procedure also helps increase accuracy and helps improve surface finishes since it tends to variations in dimensions and surfaces.

An article of this nature commonly highlights some of the topics involved. More complete information on specific problems—whether on Duronze or any other copper alloy—can be obtained by writing or phoning your nearest Bridgeport Sales Office. Our field men will be glad to serve you.

Propane Valve Uses Duronze* "Heart" For Extra Strength And Trouble-Free Service

*Aluminum-silicon bronze



The cylinder valves that regulate LP gas in home systems must have tough construction, be easy to operate and offer maximum safety. To fill these needs, the Aluminum and Brass Co., Inc. of Lockport, N. Y. makes high-quality propane valves that use Bridgeport's Duronze 707 Alloy for the lower stem assembly—the "heart" of the valve.

Duronze Requirements

These stems must really take it—stand up under severe service, be unaffected by sudden temperature changes and also resist corrosion to avoid freezing or sticking. To meet these tough material requirements, the manufacturer specified Duronze 707—a high-strength, aluminum-silicon bronze alloy that can also be machined to the close tolerances needed for the valve parts.

Solving the Problem

Before Duronze was used, the lower valve stem was made of brass. The constant shutoff action of the valve exerted a crushing pressure on the stem, which in turn developed a concave area in the brass seating member and prevented a gastight seal. Because Duronze is not affected by this shutoff action, this problem has been eliminated.

Matching Metal to Job

These propane valves are another example of how Bridgeport matches the metal to the job. By working closely with the manufacturer, the Bridgeport salesman was able to meet his specifications exactly and help contribute to the over-all superiority of the product. The Bridgeport salesman who calls on you, or our nearest sales office, is always ready to offer you the same service on your products. Call them to use this service to your advantage.



BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Connecticut. Offices in Principal Cities

In Canada: Noranda Copper and Brass Limited, Montreal

W. Paul Eddy

SAE Picks a Metallurgist

Here is the first metallurgist ever elected president of SAE.

If your car has undercoating, it was made possible largely through his efforts.

Now he is using his metallurgical know-how to build bigger and better aircraft engines.

■ About the closest you can come to an amphibious metallurgist is W. (for William) Paul Eddy, 1957 president of the Society of Automotive Engineers and chief of engineering operations at Pratt & Whitney Div., United Aircraft Corp.

On the highways, the sea lanes, and the airfields the wiry, 56-year-old engineer-executive is making an indelible stamp. Among his more notable accomplishments are plastic undercoating for automobiles, hardened cast iron cylinder linings that have doubled cylinder life, and a new alloy steel for aircraft gears and shafts.

Trains Seamen—Nautically, his efforts are more a hobby than a professional undertaking. A boating enthusiast since childhood, he is no less adept at handling a sextant than a slide rule.

When his 36-foot sloop Hyades III is tied up for the winter at Mystic, Conn. Mr. Eddy spends hours each month teaching navigation to members of the Hartford Power Squadron. He regards the sea as an ideal escape valve for the busy executive. "If you can't get a job done in a 45 or 50 hour week," he recommends "you might as well go fishing and try again next week."



Syracuse Alumnus—Mr. Eddy says he inherited his mathematical ability and love for boats from his father, a financial man. At Syracuse University, where he was graduated in 1923 with a B.S. in chemistry, he relaxed from his studies by singing a lilting baritone with the Tambourine and Bones, a musical and dramatic group.

He got his first job as a metallurgist with Crucible Steel Co. of America. Afterward, he went with Geometric Tool Co. and then to General Motors Corp.

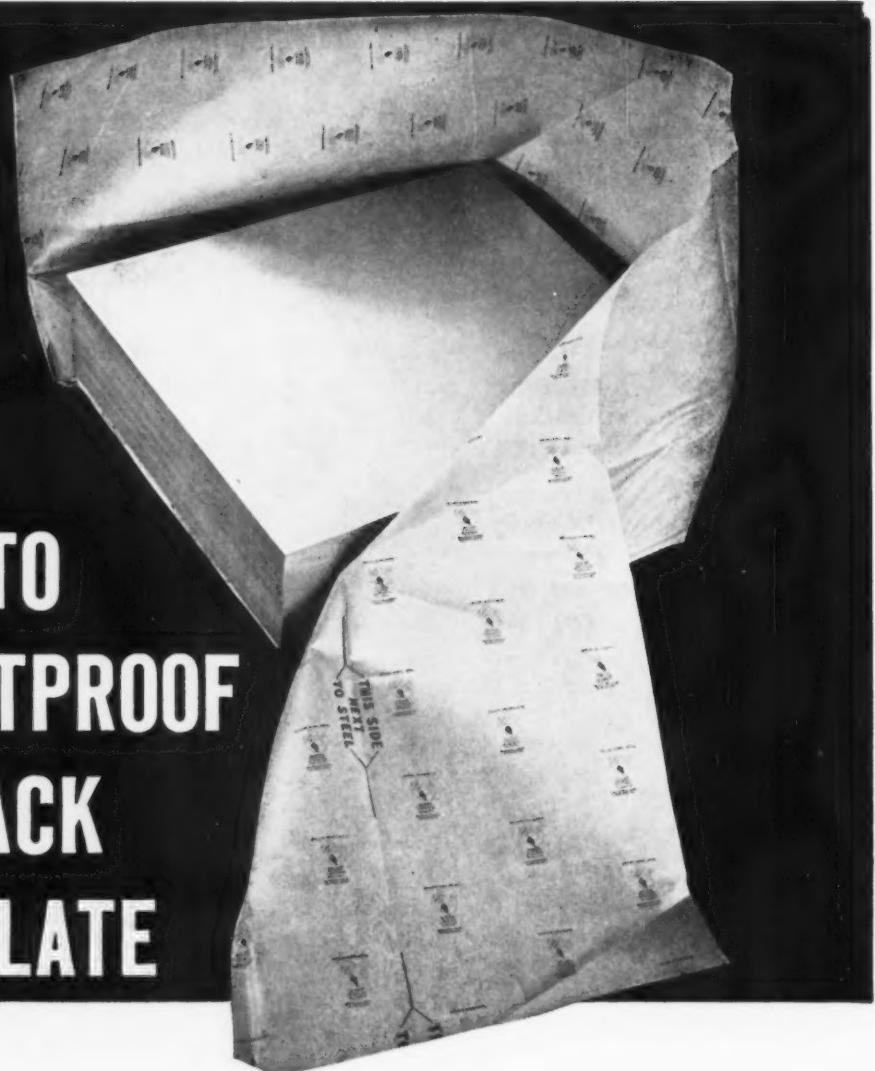
Heavy Responsibility—When he joined Pratt & Whitney in 1944, Mr. Eddy startled associates with his ability to arrive at speedy con-

clusions. "He sees through problems so fast that a discussion with him seems to end before it has hardly begun," points out one associate.

In his bailiwick are inspection, materials engineering and experimental construction departments. Also the experimental hangar and flight test, and experimental test laboratories.

Criticizes Education—In 20 years as a member of SAE, Mr. Eddy has seen a lot of engineers come and go. He feels strongly about what an engineer should and should not be. "His education should include a wider variety of cultural subjects," he says.

HOW TO RUSTPROOF BLACK PLATE



Rust is a problem anytime, but it's particularly serious with black plate. On this light gauge, dry, uncoated steel, rust can start from a fingerprint. "Sweating" due to sharp temperature changes will cause immediate rusting on surfaces and edges.

Leading mills are now eliminating rust problems by packaging black plate in Ferro-Pak, Cromwell's volatile corrosion inhibitor paper. Chemical vapors from Ferro-Pak form an invisible film around the steel that prevents rust from getting a start, even when moisture is present.

The new Ferro-Pak sheet above was custom-made by

Cromwell's "Paper Engineers" to meet steel mill requirements for shipping black plate and dry sheet steel. It is water-proof, strong, yet highly flexible and easy to handle. Its chemical rust inhibitor is non-toxic . . . compatible with oil . . . stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write **Cromwell Paper Company, 4803 South Whipple St., Chicago 32, Illinois.**

FERRO-PAK® by Cromwell "Paper Engineers"



RUSTPROOFING A FREIGHT CAR. Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.

Who's Running Domestic Policy?

While Ike is submerged in foreign affairs, he's turned over domestic issues to advisors.

But these advisors aren't all big names. New forces and faces are shaping policy.

■ Do you recall President Eisenhower's inaugural address? You probably remember that he devoted a scant few paragraphs to domestic affairs. The vast bulk was directed at foreign relations.

It was global talk of the largest kind. And subsequent events proved it a valid portent of things to come in his second administration.

It's apparent that Ike budgets his desk time at about the same ratio as his inaugural address. He devotes more and more of his time to foreign affairs; less and less to domestic.

Who's in Charge—The result is that domestic issues have been taken over lock, stock and barrel by the Presidential advisors, and not necessarily those in the cabinet. Those who are running the domestic side of the Executive Dept. are almost to a man of the liberal wing of the GOP. Conservatives, even in the cabinet, are seldom consulted.

This is the principal factor behind the Administration's budget, which amazed many Republicans and not a few Democrats in its size and emphasis on welfare aspects.

Size of the budget is a matter of deep concern to those who believe, like Treasury Secretary George Humphrey, that the long-range outlook for the economy is not good; although no depression looms in the near future.

On the Record — President Eisenhower must share somewhat similar fears. Otherwise, he would have sent Secretary Humphrey packing for Cleveland when he was outspoken against his Chief's appropriations recommendations.

But the object of the liberal wing is to have on the record at least,

recommendations for welfare measures that will leave the Democrats little ammunition in 1956.

It may be somewhat of a surprise, but Vice President Nixon, who once enjoyed the support of the conservative wing, is looming more and more as a leader of the liberal side.

No Letup in Expansion—Yet

Could Be Trouble—There have been a few major cancellations and/or delays in expansion plans of some industries. This has led to no little speculation that the bloom is off the capital goods boom.

You don't have to be reminded that industry's spending for new plants and equipment was probably the major factor in 1956's record business year. If business seriously curtailed its spending programs, it could mean trouble ahead.

But if there is any cutback, it doesn't show up in construction figures as yet. This year is away to

a fast business building program that is even ahead of a year ago.

The Facts—A 4 pct increase in all construction contracts for January, '57 over the same month a year ago (according to F. W. Dodge reports) doesn't tell the entire story.

Manufacturing construction was a full 32 pct over a year ago to a fat \$228 million for the year. Commercial construction showed a 27 pct gain. Even home building contracts gained over a year ago. However, the scant one pct increase is attributed to increased costs. The number of units actually declined.

But—Watch Inventories

Sharp Eye—In spite of the encouraging January figures, business capital spending remains one of the two key points to watch. The other is the level of business and industrial inventories.

The specter of an inventory recession like 1954 is enough to put a chill into anyone. For the moment, there is little to worry about. Even though sales of some products have fallen off, the current level of inventories is not excessive in relation to sales. But, there is a temptation to cut.

Easy Money—Some industries, the auto industry, for example, have even completed their inventory control programs without damaging the gross national product. But if inventory cutbacks became widespread, it could have serious effects.

Availability of many materials that have been scarce, and even lower prices of some commodities, could have the effect of curtailing inventories. However, the general trend of increasing prices offsets many inclinations to cut back.

Big Design Changes Are Coming

Lower Cars Will Bring Many Problems

You may be wondering where auto styling will go after slanted tail fins are worked to death.

There are some big surprises in store. To design engineers, it means headaches.

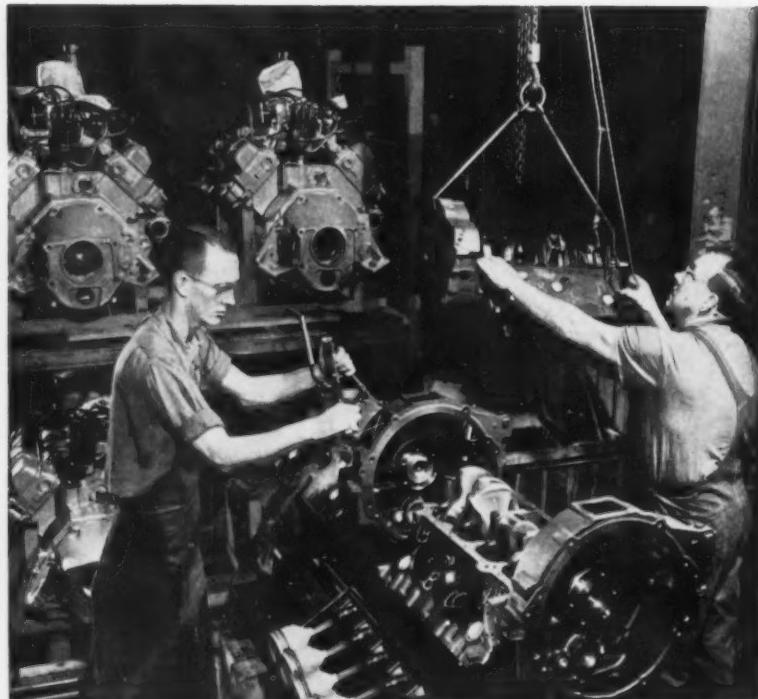
For instance, in 1967 you will open a butterfly door and plop down on an air-cooled seat.

- One of the favorite pastimes of automotive engineers is speculating on cars of the future. The subject is discussed on frequent occasions, especially when engineers have a meeting.

Victor G. Raviolo, director of advanced product study and engineering research at Ford Motor Co., is no exception. He discussed cars of the future at a recent meeting of engineers in Indiana. Mr. Raviolo says that future cars are going to be much lower. Within the next 10 years, he predicts, cars will be only 52 in. high. This is approximately the height of the present Ford Thunderbird.

Shoehorn Fit—For some producers it will only be a matter of dropping the car a few more inches. This year's automobiles range in height from 54 to 61 in. Even though there may only be a small difference, the lower car is going to create many problems.

One of them will be ground clearance. Another will be getting the passenger in and out. This problem alone, Mr. Raviolo says, will probably result in cars with sliding roofs or tilting tops. Another solution could be butterfly doors that swing into the roof.



POWER PACKAGE: Production workers at GMC Truck & Coach Div., Pontiac, Mich., assemble all-new V-8 engines for GMC trucks. With demand increasing, the division is devoting more time to V-8 manufacturing.

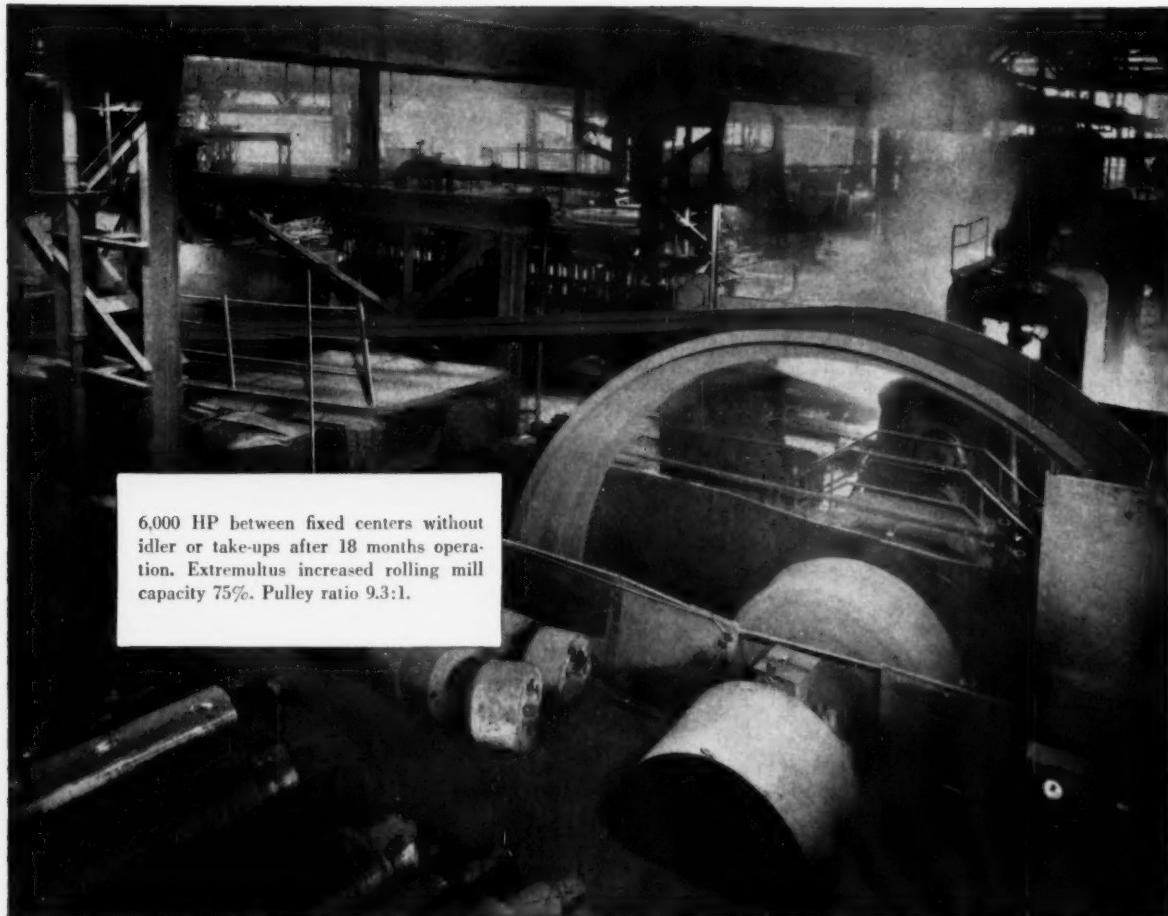
Air Conditioning—In any event, Mr. Raviolo says that lower cars are fundamentally sound. A smaller frontal area would result in less wind resistance and, therefore, less noise. Another factor which will contribute to a decrease in wind noise is the prediction that all future cars will be completely air conditioned. Heat will be added or removed while clean air is distributed to every part of the passenger compartment.

Such an innovation would make it possible to permanently seal the windows and build them flush with

the exterior of the car thus insuring smoother air flow and less noise. Also on the subject of air conditioning, Mr. Raviolo predicts great things for automobile seats. One boon to summer drivers will be ventilation right through the seat material.

Better Brakes—Engine horsepower will probably increase from 25 to 40 pct within the next few years. This will call for improving brakes and steering systems. Mr. Raviolo says that today's cars already have greatly improved brakes.

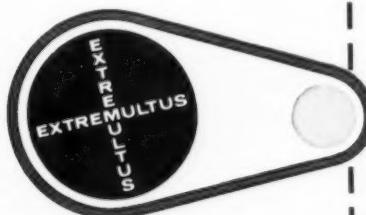
"The driver of a 1957 car going a



6,000 HP between fixed centers without idler or take-ups after 18 months operation. Extremultus increased rolling mill capacity 75%. Pulley ratio 9.3:1.

This Belt Drive Transmits 6,000 HP

The rolling mill installation shown above is typical of the "impossible" belting problems which EXTREMULTUS solves with ease. This new belt, a combination of leather and plastic, is out-performing and replacing existing V-belts, chains and flat belts everywhere! EXTREMULTUS permits speeds to 10,000 ft. per min., ratios as high as 20:1, arcs of contact as low as 90°, unexcelled elasticity and shock absorption, a range from 1/10 to 6,000 HP! In addition, EXTREMULTUS requires widths a fraction of belts replaced, eliminates take-up because of its freedom from stretch, needs no idlers yet operates on standard pulleys! Write today for full information for the EXTREMULTUS answer to your toughest drive problem!



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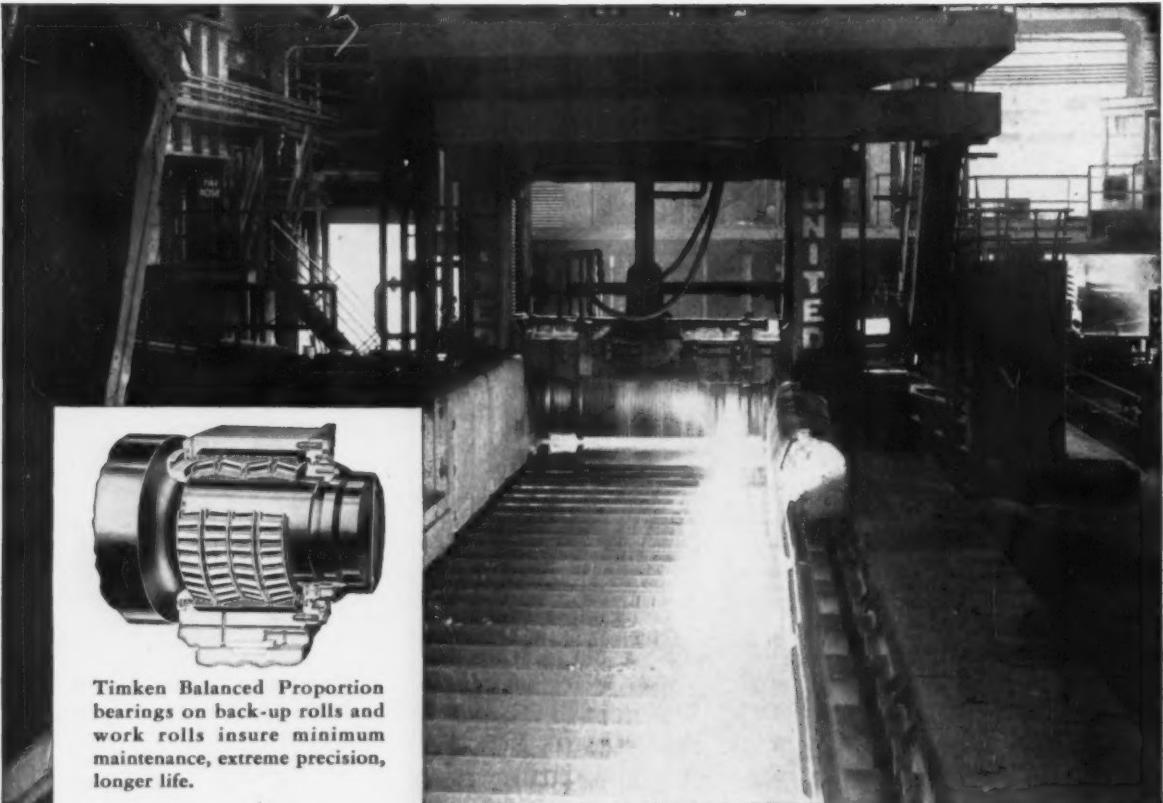
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Timken Balanced Proportion bearings on back-up rolls and work rolls insure minimum maintenance, extreme precision, longer life.

2-high bloom and slab mill starts faster, drives easier on TIMKEN® balanced proportion bearings

WITH the roll necks on this 2-high bloom and slab mill—built by United Engineering & Foundry Company for Pittsburgh Steel's Monessen, Pa., plant—mounted on Timken® balanced proportion bearings, friction is practically eliminated. This means lower starting resistance, faster acceleration, easier roll drive and higher rolling speeds. And because the balanced proportion design of Timken bearings permits larger diameter roll necks with no increase in bearing O.D., roll neck strength is increased up to 60%—load ratings up to 40%.

No special thrust bearings are needed; Timken bearings take radial and

thrust loads in any combination. And full line contact between the rollers and races of Timken bearings gives them extra load-carrying capacity. Complicated lubrication systems are eliminated, too; Timken bearings permit simple, economical grease lubrication. Rolls can be changed quickly and easily. Wear is greatly reduced, long life is assured. Timken bearings are designed geometrically to *roll true*... and are precision-manufactured, under the most rigid quality controls, to conform to their design. Timken bearings show lowest cost per ton of steel rolled.

Always specify Timken balanced proportion roll neck bearings. For

full details, consult our roll neck specialists. Write to: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



*This symbol on a product means
its bearings are the best.*



TIMKEN

TRADE MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

Automotive Production

WEEK ENDING	CARS	TRUCKS
March 2, 1957*	138,938	23,800
Feb. 23, 1957	139,038	23,342
March 3, 1956	132,889	24,643
Feb. 25, 1956	125,537	22,673
TO DATE 1957	1,240,607	194,003
TO DATE 1956	1,219,235	216,760

*Estimated. Source: Ward's Reports

normal 60 mph on the highway has far greater brake capacity than the driver of an older car going at the same speed, and, therefore, he is safer," he says.

Another safety feature which may soon make its debut is a warning device that will allow for deceleration if a car gets too close to the rear of another vehicle. Such a device will be necessary because of the high speeds that cars will travel on modern expressways. As vehicle speeds increase, it is sometimes hard to judge how fast you are coming up on another car.

Under the Hood—In the steering department, the Ford engineer says that there will be systems that actually compensate for varying road conditions.

All of these items are going to call for more powerful engines because the more power accessories placed on a car, the more horsepower it needs. Even today, a complete line of accessories on a vehicle can use up as much as 45 horsepower.

Bigger engines will also make it possible to improve transmissions. Mr. Raviolo says a hydrodynamic torque converter with a reverse gear could replace the present 3-speed and reverse gear box.

Engine life, which has almost doubled in recent years, will be extended even further.

GM Awaits Ruling

A decision on whether to throw out or prosecute the government's antitrust suit against General Motors Corp. is coming up March 26.

The suit was brought specifically against the GMC Truck & Coach Div. and several bus companies.

It claims that the division took part in practices which helped to create a monopoly in the bus business.

In answering the suit, GM asks that it be thrown out of court because all the charges were contained in a similar suit against General Motors a few years ago and this case was thrown out.

There is one difference this time. GM was the sole defendant in the old case. The fact that the bus companies are co-defendants may have some bearing on the case.

1956 a Poor Year For Automakers

Anybody who may have doubted that 1956 was a poor year for the auto industry, need only look at the annual report of General Motors Corp. Net sales last year were down over \$1.5 billion compared to 1955. By the same token, net income declined \$342 million from the previous year. Earnings per share were equal to \$3.02 compared to \$4.30 for the same period in 1955.

The decline of total GM dollar sales was 13 pct. The corporation

says it was caused mostly by a softening of the domestic automobile market and to a lesser extent by a decline in defense sales.

Despite the decline, it was still the second best year in GM's history.

GM Gives Ground—Thus, even though it was not as good a year as 1955, GM still maintained its number one position in the industry. At the same time, it is significant to note that evidently the corporation's market penetration fell off during the fourth quarter. While GM's earnings slipped in that period, those of both Ford and Chrysler increased at a rapid rate.

Speed Crown Fits All

The results of this year's NASCAR speed week at Daytona Beach, Fla., are now in and, as usual, just about everybody that entered won something.

Big winner this year was Pontiac. It won the Grand National race and also set acceleration records. Chevrolet won the Manufacturer's Trophy. Ford and Chrysler also picked up some honors.

By J. R. Williams

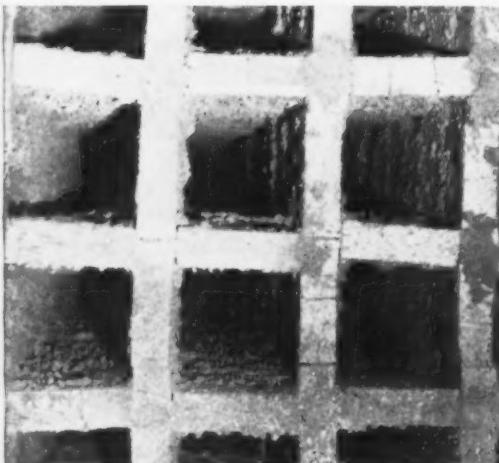


HARBISON-WALKER

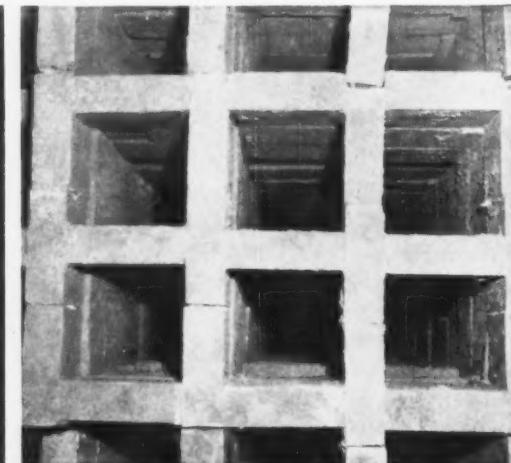
FORSTERITE L

BASIC CHECKERS

provide unusual advantages for open hearth steel furnaces



After two campaigns—378 heats—Forsterite L Open Hearth Checkers appeared as shown above. The friable character of the slight dust build-up is apparent.



Ready to go back into service. Cleaning is quickly and easily accomplished because Forsterite L Checkers resist slagging, spalling and clogging.

With the rapidly increasing use of basic brick checkers for open hearth steel furnaces, many of the various kinds have been in service for careful comparisons. Among the various classes of basic brick used in this application, FORSTERITE L, the magnesium-silicate refractory, shows unusual merit.

Important benefits which contribute to the good economy in the use of FORSTERITE L checkers are briefly enumerated.

1 Increased durability under the most severe operating conditions

FORSTERITE L checkers do not shrink or subside in soaking heats and higher preheat temperatures of the air are feasible. They are highly resistant to slagging and withstand the temperature changes involved without spalling. Because of the excellent stability of mineral composition under the prevailing regenerator conditions, FORSTERITE L brick do not permanently increase in volume nor become weak and friable.

2 Checker cleaning decreased

Due to its chemical composition, iron oxides and basic slag carry-over, do not readily react with FORSTERITE L. These basic fluxes do not wet the FORSTERITE L brick which remain clean and free from excessive clogging. The necessity of cleaning FORSTERITE L checkers used for all or part of the setting is greatly decreased.

3 Greater heat capacity

The inherent properties of the mineral forsterite account for the higher heat capacity of FORSTERITE L brand, than that of alumina-silica refractories. The heat capacity of a checker setting of a given size thus is greatly increased.

4 High efficiency maintained

FORSTERITE L checkers retain their normal texture and are less readily glazed than are various other kinds of basic, high alumina and alumina-silica refractories. High heat absorption is not reduced by increased reflection resulting from glazing.

HARBISON-WALKER REFRactories COMPANY

AND SUBSIDIARIES

GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA

Air Force Hunts More Money

Congress Could Go For \$1 Billion

Congress has always been a pushover for Air Force. This year may be no exception.

Generals have experience in gaining increases in the past, taking their case to the lobbies of Capitol Hill.

In the meantime, what are the Russians doing in military spending?—By G. H. Baker.

■ There's increasing talk in Congress of voting the Air Force more money than President Eisenhower asks. If the pressure for added funds keeps building up, the Air Force will start off its new fiscal year on July 1 with perhaps as much as several hundred million dollars more than the present budget calls for.

Ike put the Air Force down for \$17.6 billion in his budget for the 12 months beginning next July 1. (This is \$800 million more than the Air Force budget for this fiscal year.) The Air Force generals reluctantly accepted Ike's new figure, but they are making it clear by their outspoken grumbling that they don't like it.

Try for \$1 Billion—The generals have been lobbying actively in both the Senate and the House lately in a drive to get their new budget fattened up. It's beginning to look like their drive will succeed. An increase of at least several hundred million dollars seems practically assured. If their luck holds out, the generals may succeed in adding as much as an extra \$1 billion to their spending allowance.

Specifically, here's what the Air Force wants extra funds for:

Jet bombers and jet tankers.

Research and development on missiles.

Development of an atomic-powered airplane.

Some senators argue that recent improvements in missiles make less urgent the continued emphasis on manned aircraft. But as of now, the "more money for everybody" bloc in Congress is in control. It looks like they'll win.

Look at the Reds—The new budget of the Russian government shows a leveling-off in military

spending. But U. S. military officials are wondering how much military spending is concealed under such innocent-sounding labels as "agricultural education" and "mining research."

According to the new budget figures released in Moscow (in early February), the U.S.S.R. will spend about 16 pct of its gross national product on arms. However, this category does not include guided missiles, rockets, or nuclear programs.

(For purposes of comparison, the United States is spending about 10 pct of its gross national product on all types of armament.)

Army System Helps Small Business

■ Small suppliers of military goods are getting new aid toward an improved share of the Army procurement dollar.

Contracting officers now must provide written proof that small firms have a chance to bid for specific awards. This proof consists of a prepared Dept. of the Army Form 1877, Data on Proposed Procurement Action.

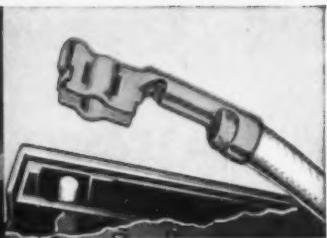
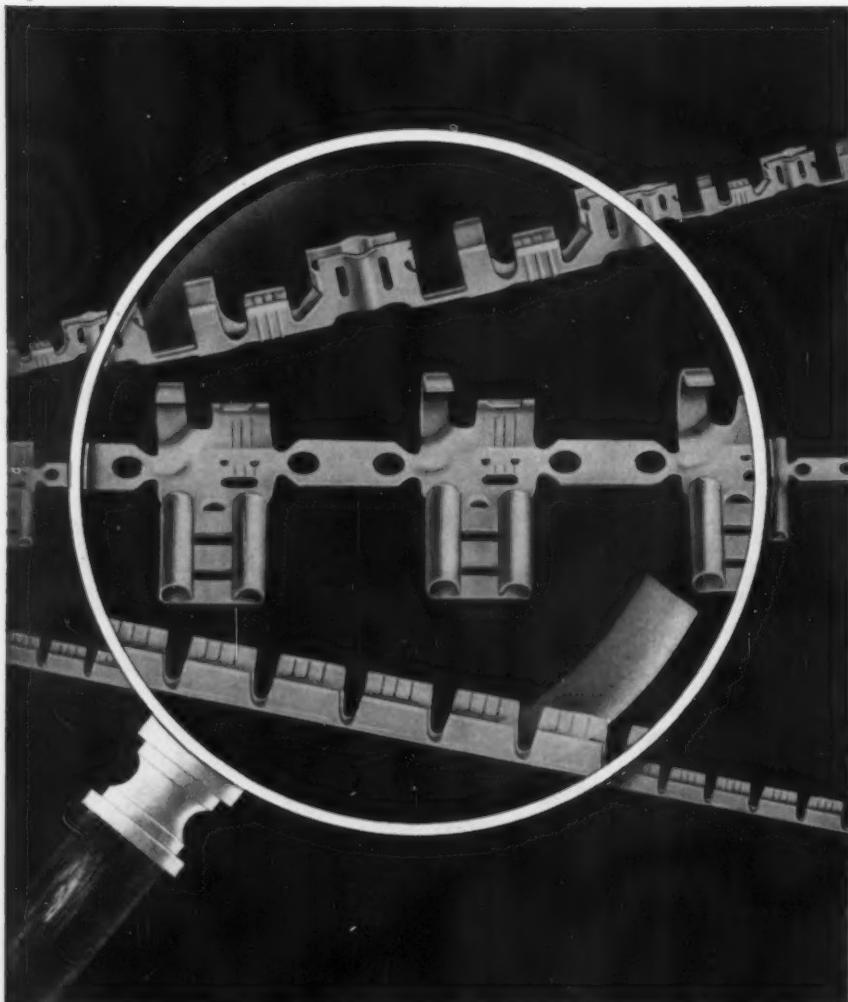
Can Do—For each bid request that will produce an award of \$5,000 or more, the officer issuing the request fills out items 1 through 22 of this form. It describes the item(s) to be bought, gives the estimated dollar value, states if the item is procurable from small business, and gives other useful details.

Three copies of DA-1877 and a

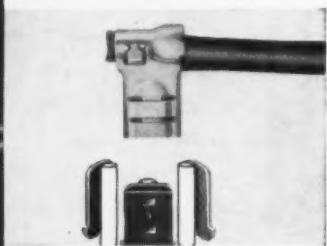
copy of the bid request go to the small business specialist at the buying office. At this point the proposed purchase is checked carefully for assurance that small firms are given a fair chance to get the award.

Yes or No—If the small business specialist decides the answer is "No," he says so on the form. He also tells the commander of the buying office, who has time to correct the condition before—and not after—the bids are received.

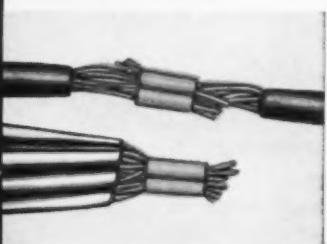
Records of the use of DA-1877 are to be kept. After the specialist completes his part of the original, he sends it to the senior small business specialist of the technical service or Army command. The field specialist keeps one copy and returns the second.



Pin receptacle made of Duraflex-hard temper, in strip form, at left, as fed into the automatic wire terminator. Finished form above.



Flag "Faston," a receptacle for .250" x .032" flat tabs, made of Duraflex-hard temper.



Connector for splicing coil windings to stranded lead wires in hermetically sealed refrigeration motors, made of Duraflex.

For solderless electrical connections that are sealed in

AMP Incorporated turned to

DURAFLEX

Electrical connections inside a sealed refrigeration unit are not easy to service. So, for long, trouble-free operation, it is essential to use superior materials.

AMP Inc., Harrisburg, Penna., is one of the leaders in the development and manufacture of solderless wiring devices. For their connectors to be used in refrigeration service they turned to Duraflex, Anaconda's superfine-grain Phosphor Bronze with superior endurance limit.

The superfine-grain structure of Duraflex offers greatly improved fatigue resistance and formability... and a finer, harder, smoother surface. It provides the extra resilience and strength for constant and enduring contact pressure essential in this type of connection. It also offers high resistance to corrosion by the moisture-absorbing additive in refrigerant, plus, of course, good electrical conductivity.

Duraflex is a premium product—yet it costs no more than ordinary phosphor bronze. Find out for yourself how Duraflex can help you cut costs, make a superior product. It is

produced in sheet metal up to .062" thick and in wire up to $\frac{3}{16}$ " diameter. Write today for free samples you can test—specifying gage and temper. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.

5674

DURAFLEX

The New Superfine-Grain Phosphor Bronze with Greater Endurance Limit

An **ANACONDA®** Product

More Pig Iron Capacity Coming?

New Blast Furnaces Are Considered

Farwest steelmen, viewing the area's rapid industrial growth, are thinking about hiking their hot metal output.

Here Columbia-Geneva President Leslie Worthington reviews pros and cons of the idea.

He also discusses the West Coast market outlook for steel products—By R. R. Kay.

■ Will the West Coast get any new blast furnaces? The prospects are good there'll be more than one new one at Columbia-Geneva Steel Div. of U. S. Steel.

That's the word from the division's new president, Leslie B. Worthington. He expects his company will hike its West Coast capacity to keep pace with population and industrial growth. Right now Columbia-Geneva accounts for a good 28 pct of the Western District's ingot output.

If national steel production should fall off this year (he doesn't think it will), West Coast steelmakers wouldn't be hurt too much. "This is a deficit area. Steel consumption here is greater than production. There may be a slackening in some products, but there will be no overall decline."

Go, Go, Go—Mr. Worthington's word for this year is: Go—and get every last ton out of every mill. He expects his division's 13,000 employees to be plenty busy. An over-100 pct-of-capacity rate seems sure.

A former head of U. S. Steel Supply Div., Worthington knows the West Coast market well. He sees no easing of supply or letup in

demand for plates, structural shapes, drill pipe, and tinplate. But soft spots may turn up in some products.

How about scrap? Mr. Worthington admits it's a hassle to get the right kind of scrap. But he's confident his buyers can turn the trick.

West Bids for A-Boat

The proposed nuclear-powered merchant ship should be built at a Puget Sound, Wash., shipyard. So urges Washington State's Thor Tollefson, ranking Republican on the Merchant Marine Committee.

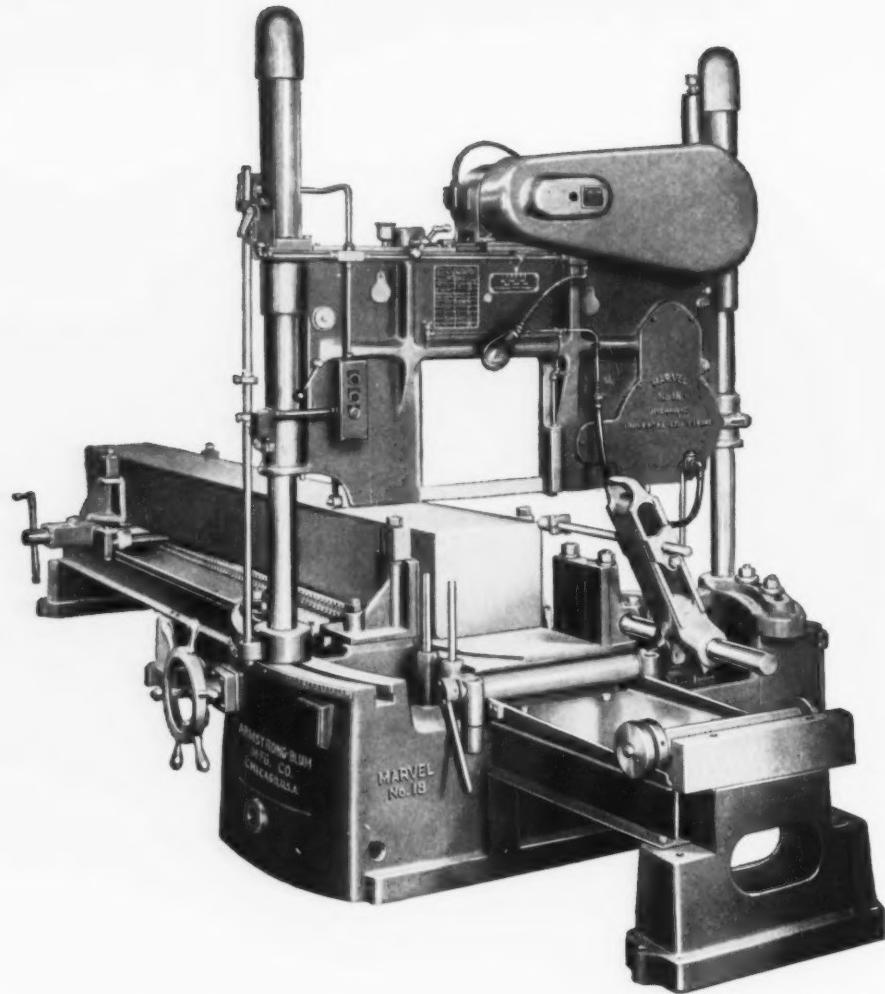
He points out to the Federal Maritime Administration that Puget Sound yards are "in a position to start early construction of the vessel." East and Gulf Coast shipyards, however, will be busy for several years on other projects in the current shipbuilding boom.

And in Washington, there's talk among shipbuilding firms about reactivating the World War II Todd-Pacific shipyard in Tacoma. If this comes about, tanker construction will be an important item.

Navy's thinking of releasing part of yard to private builders.



KING-SIZE MUFFLER: Designed to soundproof materials from sudden, uneven shock, this muffler screen can dwarf a 6-ft man. It's located in the new \$5 million trisonic wind tunnel at North American Aviation.



No Job too big or too tough... for MARVEL "Giant" Hack Saws

These giant MARVEL Hydraulic Hack Saws (No. 18, Capacity 18" x 18"; and No. 24, Capacity 24" x 24") were basically designed for rapid and economical cut-off of BIG WORK. They are not merely "conventional" designs "stretched" to big capacity. They are truly designed and built with the ruggedness and rigidity necessary to withstand the rough treatment of sawing big work, even though the work is in the "toughest of the tough" alloys.

They are reliably fulfilling the cut-off requirements in innumerable steel mills, forge shops, structural shops, warehouses, and machine shops, with assured low tool cost and minimum kerf loss of steel.

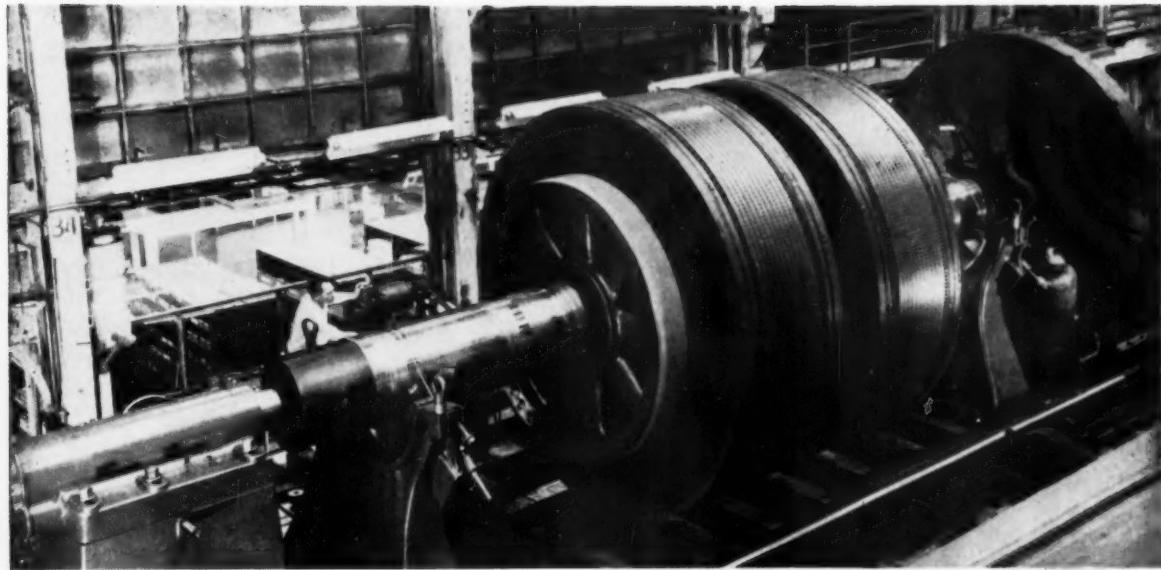
In addition to cutting-off, they are reducing costs by eliminating further machining operations. Heat treated die blocks are being reclaimed for re-sinking by sawing off the worn face; columns, beams, pipe, and tubing are being sawed to finished, square ends, eliminating milling; angular sawing is done conveniently by swinging the upper structure on the base, to any angle up to 45 degrees—without moving the work.

Contemplating the modern trend toward ever tougher steels and larger sizes, these are the logical sawing machines to buy, not only for today's needs but for tomorrow's as well.

Write for
Catalog



ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.



NEW LATHE: Unit at Westinghouse is 50 ft long, will handle jobs to 15 ft diameter, accurate to 0.0001 in.

Super-alloys Challenge Builders

Super-alloys may not be a problem for you now. But they could be.

Research is going on behind locked doors. Machines will be ready.—By E. J. Egan, Jr.

■ In ten years metal cutting machine tools will probably look radically different from the models you're using today. Certainly they'll perform differently.

Why? The reason is all tied up in one key word, "super-alloys." Right now these materials go into the "hot end" of jet engines, and into the skin surfaces of experimental supersonic planes and guided missiles.

It's Coming—What will you do when your product design engineers tell you, "Boss, to stay in business we've got to start making our widgets out of triple-tough, outer space alloy No. MF-98?" When you realize it's even harder and tougher

than some of the cutting materials you're using, you're apt to start poring through machine and cutting tool catalogs.

Machine tool builders see you coming. And they aim to be ready with the equipment you'll need.

What will it look like? Most builders say, quite frankly, "We don't know." Ask how they intend to find out and the answer comes back, "research."

New Approach—This is easier said than done. It takes men and money, neither of which is simple to come by these days. It takes something else, a research effort completely divorced from the usual day-to-day engineering.

Behind locked doors, some builders have been carefully studying metal cutting science for many years. If you could take a peek at what goes on, you would see machine tools "bugged" with all manner of wires, meters and as-

sorted instruments. What are they checking? Every problem in present-day machining practice—doubled in spades. The latest in super-alloys, cutting tool materials, coolants, clutches, brakes, bearings and control devices come to be tested.

And tested they are, at speeds and feeds you've probably never imagined possible. It gets a bit eerie because sometimes machines have to be operated by remote control. Something is apt to give way. When it does, they try it again.

Veil of Secrecy—It is difficult to get to see what is going on. But it's even more so to get anyone to talk about it. Competition is keen. Then too, when you're exploring new territory, you make mistakes. And they're always a bit embarrassing.

Nevertheless, when you add up scant observation and meager information you're certain vibration is one of the biggest factors.

INDUSTRIAL BRIEFS

Head for the Woods — Union Carbide and Carbon Corp. will construct a nuclear research center in Sterling Forest, N. Y. Major facilities will include: a five megawatt pool-type reactor, a radioactive materials laboratory, ores and engineering laboratory, and a building for allied research and administration.

Dig This — Mobile Drilling, Inc., Indianapolis, Ind., has purchased the earth drill business of the Buda Div. of Allis-Chalmers Mfg. Co. Inventories are being moved to the Mobile Drilling plant in Indianapolis.

New Offspring — A new corporation has been formed to operate as a wholly-owned subsidiary of Vinnell Co., Inc. The facility, formerly operated as the Steel Div. of Vinnell Co., will be known as Vinnell Steel. It is a steel fabricating operation.

Up in the Air — Lake Erie Engineering Corp., Buffalo, N. Y., has been acquired by the Bell Aircraft Corp. As a wholly-owned subsidiary of Bell, Lake Erie will be operated independently. The purchase is in line with Bell's policy of non-defense diversification.

Back from the Coast — Magnesium Co. of America has begun manufacture of Magcoa/Tobey aluminum trucks and other products at the East Chicago, Ind., plant. The company has discontinued operation of its fabricating facilities at El Segundo, Calif.

Facts Forum — A computing and data processing facility has been formed in Fort Worth, Texas. To be known as the Datics Corp., its services will include large-scale computing, data processing, data reduction, consulting, and research and development in related areas.

No Headache Here — Michigan Chemical Corp. has placed in operation a new bromine plant at El Dorado, Arkansas. The facility is a joint venture with Murphy Corp. of El Dorado.

Gyroscopics — Reeves Instrument Corp., subsidiary of Dynamics Corp. of America, has completed a new \$500,000 research and production unit at its Roosevelt Field plant. The laboratory will develop miniature and sub-miniature gyroscopes for military and commercial aircraft.

Summer Session — Fifty expense-free fellowships will be awarded to secondary school science teachers to study next summer at Union College under the General Electric program of education support. This program is one of six to be sponsored this year by the GE Education and Charitable Fund. The 1957 program at Union will run from June 24 through August 2.

Lots of Flash — A "welderama" and open house will be held at the new plant of the Mineweld Co., St. Louis, Mo. May 1-4. Various types of welding and cutting will be demonstrated. Aluminum cutting, use of new liquid oxygen cylinders and other new equipment will be introduced. Linde Air Products Co., Haynes Stellite Co. and Lincoln Electric Co. will participate in the show.

The Heat's On — Backlog of orders for industrial furnaces is now at an all time peace-time high, according to the Industrial Heating Equipment Assn. As of last Dec. 31, member companies reported a backlog of \$110.5 million. This is an increase of 42 pct over the \$77.6 million of Dec. 31, 1955. Among the more popular items on order are induction and dielectric heating equipment.

ACF to L&N for MIT — Leeds & Northrup Co. will supply complete control and instrumentation systems for the Massachusetts Institute of Technology Reactor. The contract was awarded by the Nuclear Energy Products Div. of ACF Industries, Inc., prime contractor. The reactor will be heavy-water-moderated, using an enriched uranium core. It is designed for initial operation at 1000-kw.

Liberal Education — Hughes Aircraft Co., Culver City, Calif., will start a work-study program for engineering undergraduates. College tuition and related expenses will be paid in full for students while they work part-time. The program is expected to raise to nearly 950 the number of part-time or full-time employees studying for degrees at company expense.

Ceramic Finished — The Bettiner Corp., Waltham, Mass., has acquired ownership of the Porcelain Enamel Products Co., Rehoboth, Mass. Bettiner produces ceramic-on-metal products and coatings for architectural and industrial use. PEPCO manufactures a line of ceramic-on-steel wall tile and accessories. Before purchase, PEPCO operated as an affiliate of Bettiner.



"That's right, Gilfoyle, you are in line for a promotion—but it's a long line."

Acme-Gridley

fully automatic turret lathe . . . gives you increased production in inverse ratio to cost

This customer chose a model MR Acme-Gridley to produce this packing gland nut, because he was able to increase his production by more than 3 times that of the former method.

The Acme-Gridley automatically controlled cycle is predetermined to give the minimum time per piece, on *every piece*. Because each tool-slide is independently cammed and selective spindle speeds are automatically controlled, machining can be done at the surface speed best suited for required finish and tolerance.

WRITE today for your free copy of new Bulletin MR-56. See why Acme-Gridley Basic Design lets you increase production and lower unit costs.



JOB FACTS

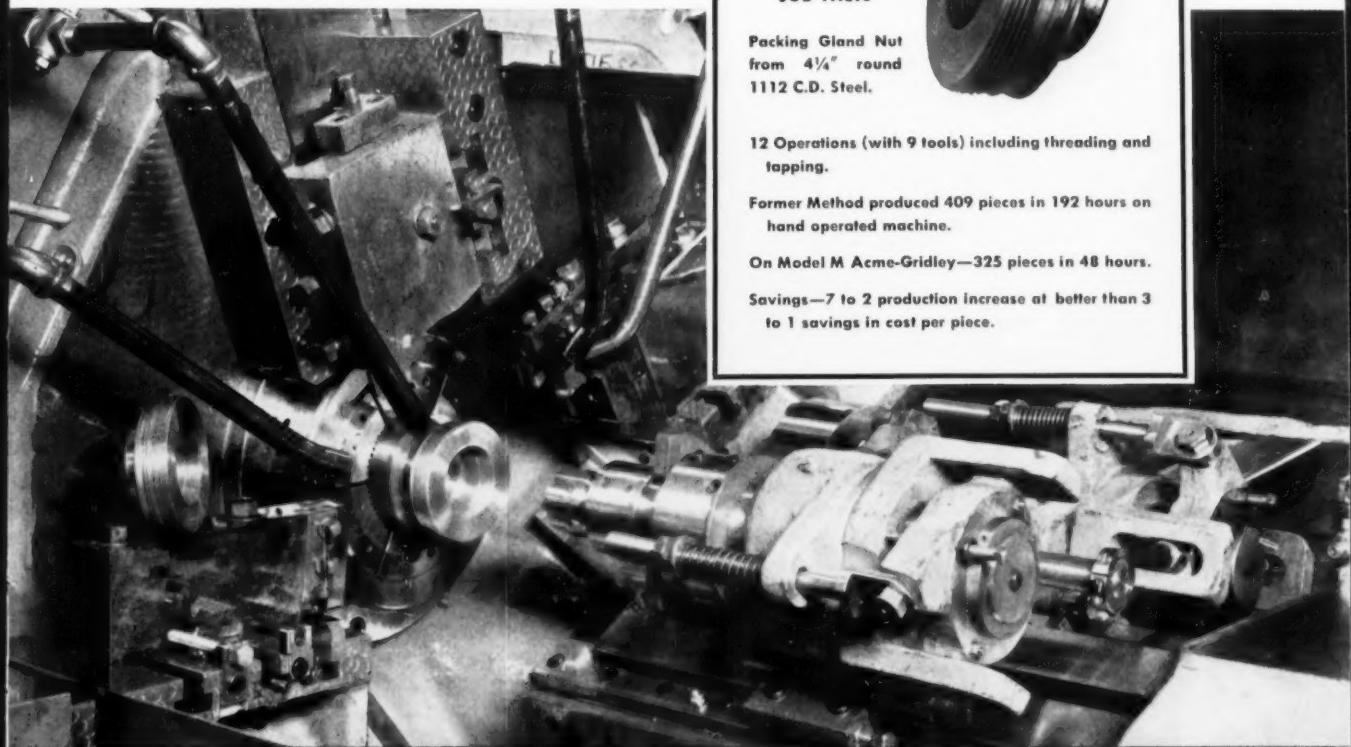
Packing Gland Nut
from 4 $\frac{1}{4}$ " round
1112 C.D. Steel.

12 Operations (with 9 tools) including threading and tapping.

Former Method produced 409 pieces in 192 hours on hand operated machine.

On Model M Acme-Gridley—325 pieces in 48 hours.

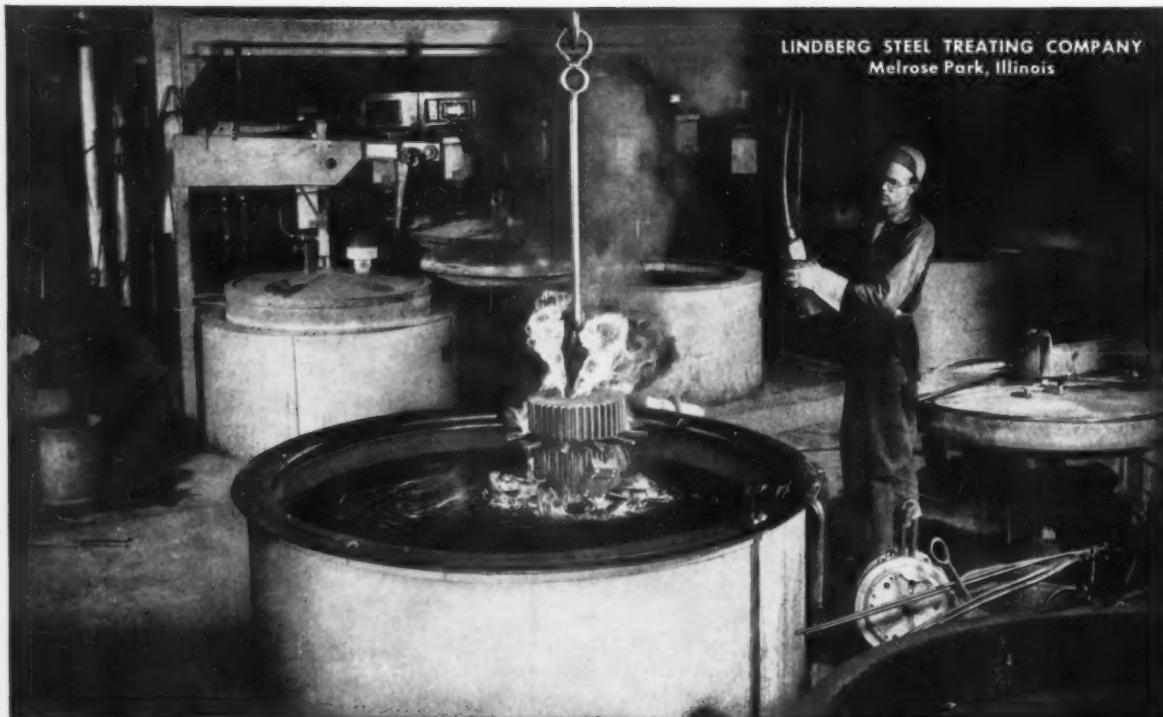
Savings—7 to 2 production increase at better than 3 to 1 savings in cost per piece.



National Acme

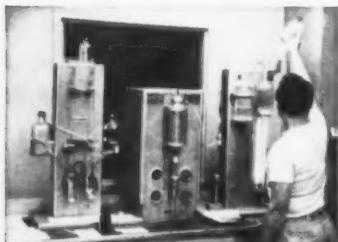
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LINDBERG STEEL TREATING COMPANY
Melrose Park, Illinois

For machine shop tolerances— Lindberg uses Cities Service Quenching Oil



Lindberg's Lab stringently tests treated metals. Dimensional changes from poor quenching oil would quickly show up here. But Cities Service Quenching Oil cools metal with no significant dimensional change.



Some of Lindberg's Furnaces. Here, they heat-treat all kinds of steel products . . . bolts, washers, gear blanks, saw blade segments, etc. Steel for bars of Illinois State Penitentiary was one of their first jobs.

At Lindberg Steel Treating Company a routine order might include a dozen shafts, stamping and forming dies, jigs and fixtures and even production parts. But though the products might differ, most would carry the same stipulation—heat treat with very low dimensional change.

To some heat treating operations this might present a problem, but not to Lindberg. By the use of Cities Service Quenching Oil, they're able to cool their steel with no significant changes in dimension.

"In addition," say Lindberg metallurgists, "we like Cities Service Quenching Oil because it has high flash point, consistent viscosity, excellent oxidation resistance, and a stable cooling rate."

Anyone looking for a better quenching oil would do well to try this superior Cities Service oil. For further information, talk with your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

MEN IN METALWORKING



Glenn P. Bakken, elected president, **Chase Brass & Copper Co.**, Waterbury, Conn.

John C. Linsenmeyer, elected executive vice president, operations, **American - Standard**, Detroit; **John W. Brennan**, elected president, American Blower Div.; **Richard S. Reade**, named president, Ross Heat Exchanger Div.



Stewart G. Fletcher, elected vice president, metallurgy, **Latrobe Steel Co.**, Latrobe, Pa.

John Pugsley, named asst. executive vice president, accounting, **U. S. Steel Corp.**, Pittsburgh.

John C. Michaud, elected vice president, Containerboard and Kraft Paper Div., **Continental Can Co.**, New York.

Loren W. Smith, appointed asst. vice president and director, metallurgical development, **Symington-Gould Corp.**, Depew, N. Y.

Patrick N. Morgan, named asst. to vice president and general sales manager, Heater & Tank Div., **John Wood Co.**, Conshohocken, Pa.



William H. Knoell, elected secretary, **Crucible Steel Co. of America**, Pittsburgh.

William M. Webb, elected asst. secretary, **Alan Wood Steel Co.**, Philadelphia.

John F. Hoffman, named asst. superintendent, electric weld pipe mill, **Kaiser Steel Corp.**, Fontana, Calif.

Paul E. Busby, named director, research, **Heppenstall Co.**, Pittsburgh.

William Bowker, Jr., named asst. superintendent, bloomers and billet mills, **Copperweld Steel Co.**, Warren, O.

James H. Werning, named general director, product engineering, die engineering, process development, and production engineering, Fisher Body Div., **General Motors**, Detroit; **Bart Cotter**, named chief engineer; **Robert M. McVeigh**, appointed asst. chief engineer.

William K. Schmalzriedt, named manager, International Div., **American Can Co.**



William R. Jennings, named manager, Machine Tool Div., **Axelson Mfg. Co.**, Div. of U. S. Industries.

E. J. Reitler, appointed sales manager, **Firth-Loach Metals, Inc.**, McKeesport, Pa.

L. C. Colleran, named sales manager, **Roll Formed Products Co.**, Youngstown, O.; **W. P. Cooper, Jr.**, named asst. sales manager.



Ernest S. Griswold, appointed chief product manager, Cutting Tool Div., **Pratt & Whitney Co., Inc.**, West Hartford, Conn.

Carl F. Norbeck, named superintendent, Openhearth Div., **Bethle-**

PERSONNEL

hem Steel's Lackawanna, N. Y. plant; **Joseph L. Walton**, named asst. general manager, Johnstown, Pa. plant. **Robert M. Jordan**, named asst. superintendent, Openhearth Div.; **Frank G. Gregory**, named superintendent, No. 1 Openhearth, **Norman W. Fennie**, named superintendent, No. 3 Openhearth.

Frederick J. O'Reilly, named general manager, manufacturing, **National Electric Products Corp.**, Pittsburgh.



Robert A. Laws, named manager, sales engineering, **Baker - Raulang Co.**

Edward Gerstenschlager, named manager, production engineering, Boiler Div., **The Babcock & Wilcox Co.**, Barberton, O.

George P. Woodward, named manager, Philadelphia district sales office, **Archer-Daniels-Midland Co.**

Lawrence W. Kelbley, named director, manufacturing, **Datamatic Corp.**

Wilfred R. Overby, appointed manager, manufacturing, Carter Carburetor Div., **ACF Industries, Inc.**

L. D. Rexroat, appointed mid-western sales manager, **Topp Industries, Inc.**, Los Angeles.



Charles B. Pretzinger, named Pacific Coast district manager, **Pangborn Corp.**, Hagerstown, Md.

Ardon B. Judd, elected president, **Southwest Fabricating & Welding Co.**, Houston, Texas, subsidiary of Walworth Co.

J. C. Drader, elected vice president, research, **Michigan Tool Co.**, Detroit.

H. A. McPherson, named asst. to works manager, Sault Ste. Marie plant, **Electro Metallurgical Co.**, Div. of Union Carbide and Carbon Corp.; **J. H. Smallridge**, named superintendent; **S. L. Slater**, appointed asst. superintendent, power and calcium carbide operations.



William S. Patterson, named director, executive sales, Pacific Coast region, **Reynolds Metals Co.**

James E. Baltzell, named superintendent, Maintenance Shops Dept., **Armco Steel Corp.**, Middletown, O.



MEEHANITE CASTINGS ARE MADE ONLY BY MEEHANITE FOUNDRIES

The American Laundry Machinery Co., Rochester, N. Y.

Atlas Foundry Co., Detroit, Mich.

Banner Iron Works, St. Louis, Mo.

Barnett Foundry & Machine Co.,

Irvington, N. J.

Blackmer Pump Co., Grand Rapids, Mich.

Centrifugally Cast Products Div., The

Shenango Furnace Co., Dover, Ohio

Compton Foundry, Compton, Calif.

Continental Gin Co., Birmingham, Ala.

The Cooper-Bessemer Corp.,

Mt. Vernon, Ohio and Grove City, Pa.

Crawford & Doherty Foundry Co.,

Portland, Ore.

Empire Pattern & Foundry Co., Tulsa, Okla.

Florence Pipe Foundry & Machine Co.,

Florence, N. J.

Fulton Foundry & Machines Co., Inc.,

Cleveland, Ohio

General Foundry & Mfg. Co., Flint, Mich.

Georgia Iron Works, Augusta, Ga.

Greenlee Foundry Co., Chicago, Ill.

The Hamilton Foundry & Machine Co.,

Hamilton, Ohio

Hardinge Company, Inc., New York, N. Y.

Hardinge Manufacturing Co., York, Pa.

Kanawha Foundries, Inc., Grove City, Pa.

Kanawha Manufacturing Co.,

Charleston, W. Va.

Koehring Co., Milwaukee, Wis.

Lincoln Foundry Corp., Los Angeles, Calif.

Palmyra Foundry Co., Inc., Palmyra, N. J.

The Henry Perkins Co., Bridgewater, Mass.

Pohlman Foundry Co., Inc., Buffalo, N. Y.

The Prescott Co., Menominee, Michigan

Rosedale Foundry & Machine Co.,

Pittsburgh, Pa.

Ross-Meehan Foundries, Chattanooga, Tenn.

Sonith Industries, Inc., Indianapolis, Ind.

Standard Foundry Co., Worcester, Mass.

The Stearns-Roger Mfg. Co., Denver, Colo.

Valley Iron Works, Inc., St. Paul, Minn.

Vulcan Foundry Co., Oakland, Calif.

Washington Iron Works, Seattle, Wash.

Dorr-Oliver-Long, Ltd., Orillia, Ontario

Hartley Foundry Div., London Concrete

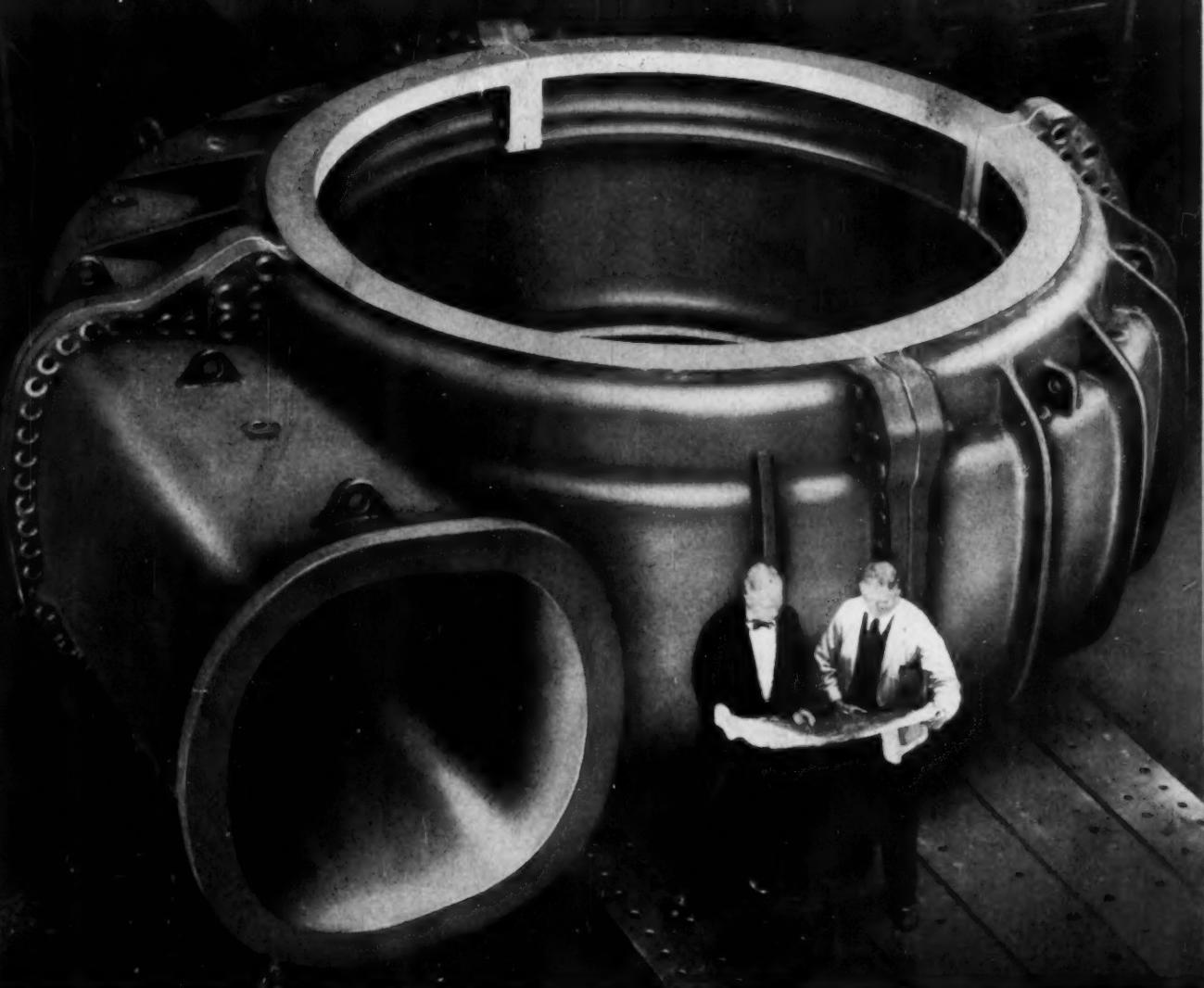
Machinery Co., Ltd., Brantford, Ontario

Otis Elevator Co., Ltd., Hamilton, Ontario



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FOR YOUR
FREE
SINGLE COPY**

• "MEEHANITE CASTINGS FOR PRESSURE
TIGHTNESS" BULLETIN NO. 43



This huge casing for an 84" volute pump was cast in four sections in high strength (over 50,000 psi) Meehanite metal.

Pressure tight Meehanite castings are uniformly sound and possess high strength values

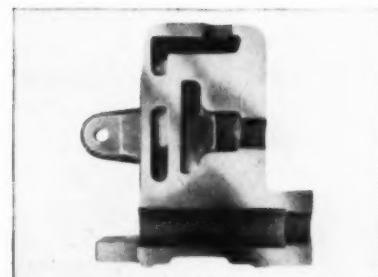
Meehanite metals provide designers, production men and engineers with a group of dependable materials that possess the superior combination of physical properties required by pressure tight castings used with water, oil, steam, gas and other substances.

The consistent uniformity of the structure of Meehanite metal throughout all casting sections insures excellent performance in service and offers positive freedom from

leaks, porous zones and structural weakness.

In addition, Meehanite castings provide high strength values in the order of 55,000 lbs. psi and have a true modulus of elasticity which is important in computing bursting stress.

If you would like to know more about the advantages of Meehanite metal, write today for your free copy of bulletin #43 "Meehanite Castings for Pressure Tightness."



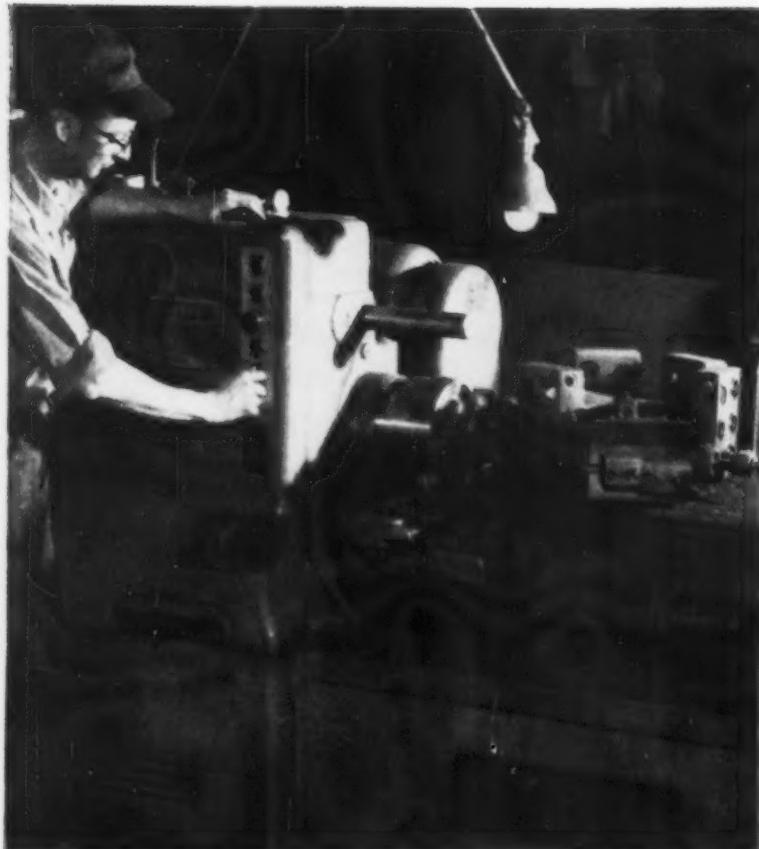
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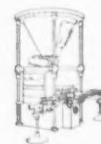
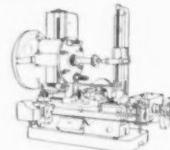
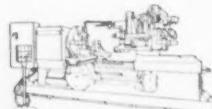
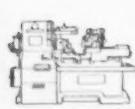


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K. E. Kiess, named works manager, Findlay Div., **Gar Wood Industries**, Findlay, O.

Addison Davidson, Jr., appointed eastern district sales manager, **Femco, Inc.**

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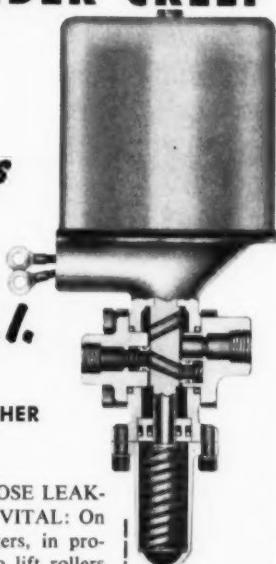
5125 Alcoa Avenue, Los Angeles 58, California

March 7, 1957

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that last

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they depend on leakage for
lubrication, dirt can enter spool
clearances, cause binding and
coil burnout.



Note the mirrorlike
sealing surfaces on
this Dual Pressure
Valve rotor after
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On extrusion presses, die casting machines, rubber and plastic molding presses and on blowout preventers, they have performed without maintenance longer than any other type of valve.

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SERVICE is possible because the metal-to-metal sealing surfaces are self-aligning and actually improve with use through continued lapping action. Sealing qualities do not diminish because a spring compensates for the wear.

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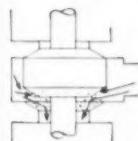
because flow is through "Shear-Seals," sealing surfaces remain in constant intimate contact.

COMPLETE CONTROL OF

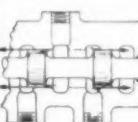
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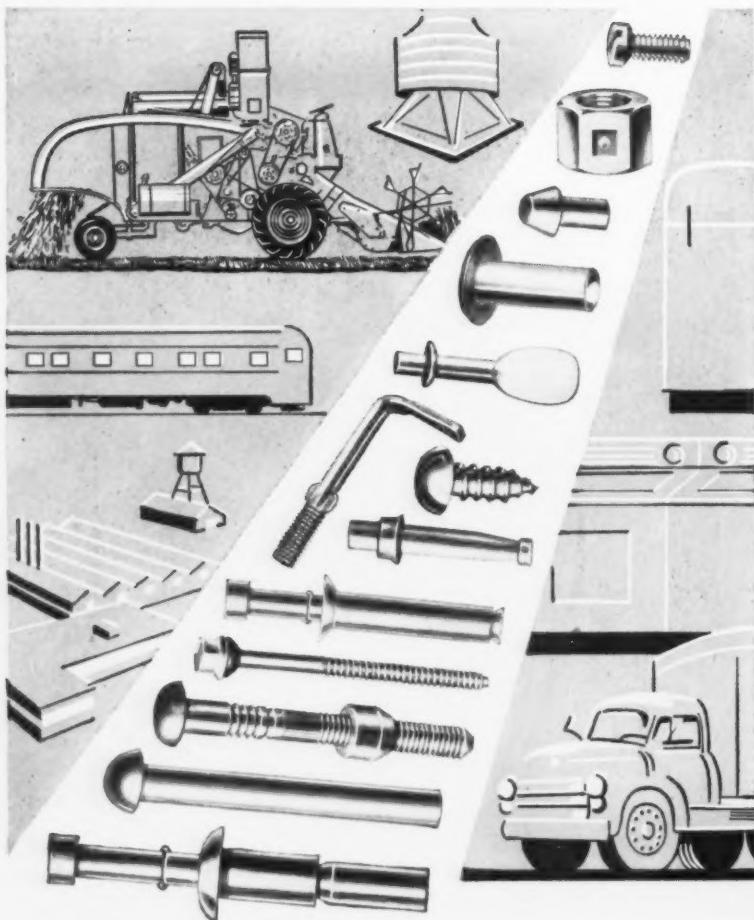
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Dr. Robert P. Petersen, elected president, **Applied Research Inc.**, Chicago.

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Dan R. Scott, named sales manager, Allied Products Div., **Motch & Merryweather Machinery Co.**, Cleveland.



A. C. Pease, named district manager, sales office, **Air Reduction Co.**, Louisville, Ky.

Austin Rising, elected vice president, marketing services, York Div., **Borg-Warner Corp.**, York, Pa.

Following appointments are within the new insulating materials section of General Electric Co. **Paul D. Williams**, named marketing manager; **Dr. James Marsden**, named engineering manager; **A. L. Jewett**, appointed finance manager; **Rial O. Herreman**, named employee relations manager; **G. M. Yesse, Jr.**, appointed facilities planning project manager; **J. C. Morris**, named mica products and coated materials plant

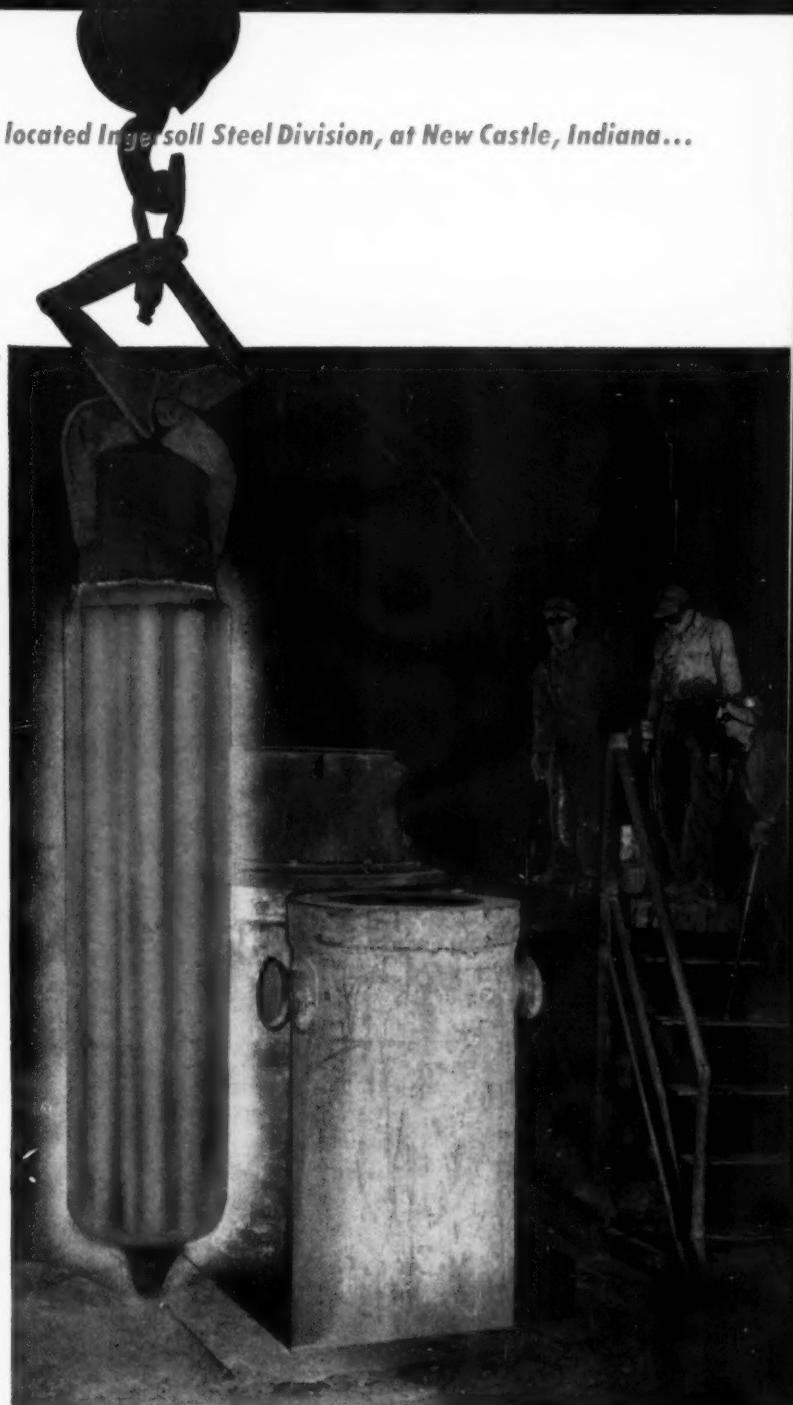
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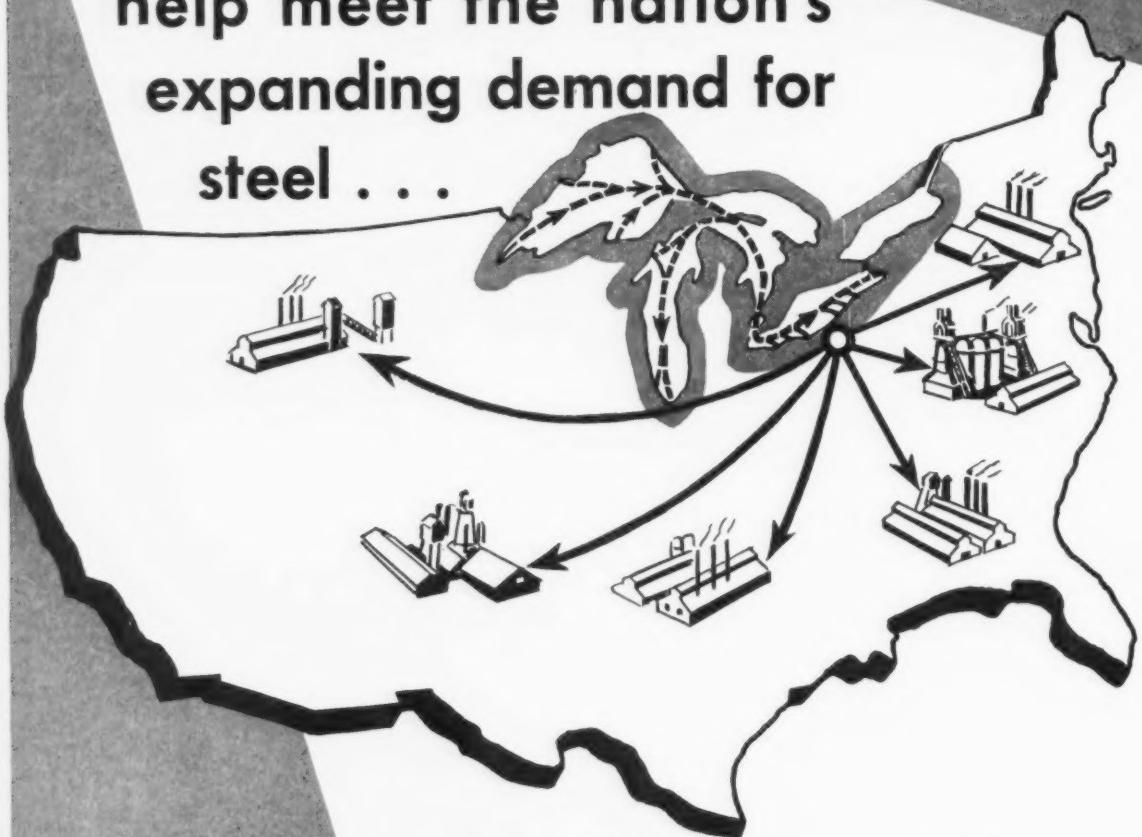


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Howard G. Hart, named St. Louis district sales manager, **Harbinson-Walker Refractories Co.**



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Fred L. Brewer, named asst. to director, purchases, **A. O. Smith Corp.**, Milwaukee.

Bertram J. Toolin, Jr., named product metallurgist, Sheet Mill, Metallurgical and Inspection Dept., Fairless Works, **U. S. Steel Corp.**

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Arthur F. Erwin, named engineer, nuclear pump section, **Allis-Chalmers West Allis Centrifugal Pump Dept.**

C. F. Spencer, named general purchasing agent, construction procurement, **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif.

M. G. Smith and **Kurt O. Plache**, named sales representatives, Denver and Kansas City district, respectively, **Allis-Chalmers Industries Group**.



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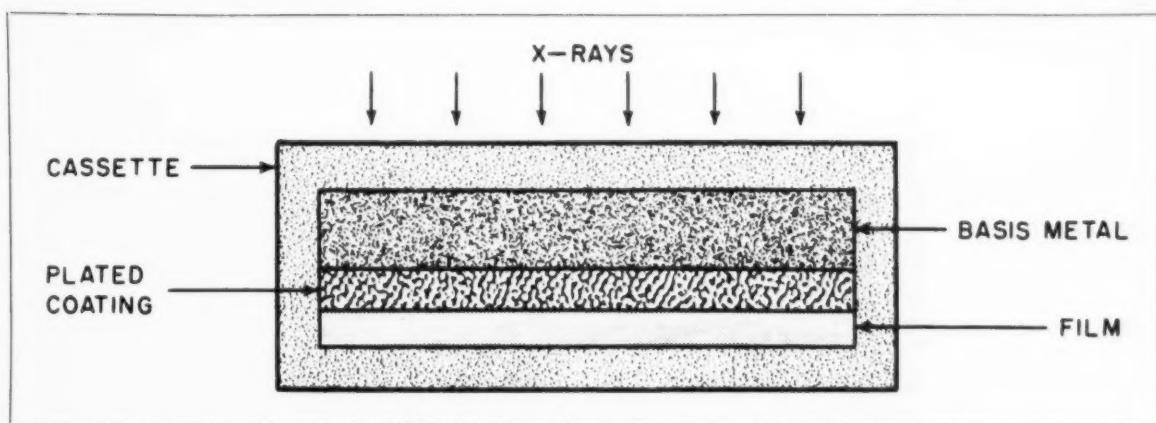
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New Test Checks Electroplating Porosity

By **F. Ogburn**—Asst. Chief, Electrodeposition Section and **M. Hilkert**, former Research Associate, AES, National Bureau of Standards, Washington.

Here's another significant step forward in the field of non-destructive testing.

It's a radiographic method for checking the porosity of plated coatings.

Not only is it dependable, but it does absolutely no harm to the plated surface.

■ How can you **nondestructively** check adherent plated coating for porosity, pits, or other discontinuities?

New radiographic methods—one of which was recently developed at the National Bureau of Standards—do the job by making use of either of two possible sources of radiation.

One source may be a plated layer of radioactive metal between the basis metal and the coating. Or radiation may be external to the

plated specimen in the form of an X-ray machine or radioactive material.

No Damage—With either source, the new methods can detect discontinuities as small as 0.001-0.002 in. (25 or 30 microns) in diameter. And they can spot such defects without altering or damaging the specimen in any way.

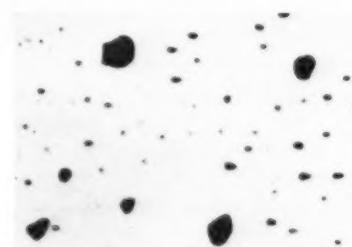
The radioactive-metal-layer method, developed at Rock Island

Arsenal, came first. It calls for plating a radioactive metal coating directly over the basis metal. The electrodeposited coating to be checked is then plated directly over the radioactive layer. By placing a suitable photographic film over the plated surface, a radiograph of the porosity can be obtained.

Refinement—In addition to the fact that this method is somewhat roundabout, it may also have some



NICKEL FOIL: Radiograph was made with non-uniform radioactive electroless nickel plate as radiation source.



NICKEL ON STEEL: Large spots correspond to stopped-off reference points. Most others correspond to visible gas pits.

effect on the porosity of the final coating. The second method, making use of an external source of radiation, is a refinement of the first. Its usefulness extends to both research and production.

With the newer method, the final coating is plated directly on a thin sheet of the basis metal. A film is placed over the coating, and the assembly is exposed to suitable radiation. This technique permits the repeated use of the same radiation source. Also, separate radiographs of the same coating can be made using different radiations.

Varied Thickness—For most of the work, specimens were 1010 cold-rolled steel sheet 0.001-0.003 in. thick. These were plated on one side with 0.0005-0.001 in. of Watts nickel. (The basis metal must be limited to thicknesses which yield good radiographs in a reasonable time of exposure).

Thicknesses of 0.001, 0.002, 0.003, and 0.030 in. were tried. Except for the 0.030 in. specimen, satisfactory radiographs were obtained in 3 or 4 minutes with an X-ray machine and in 24 hours with about 1 microcurie of Cobalt 60.

Real Smooth—To get the best radiographs, the emulsion of the film must be in close contact with the coating and the coating and basis metal should be uniform in thickness. For close contact, the coating must be flat and smooth. Uneven thickness of coating or basis metal can result in a non-uniform exposure of the film.

Among the films tried were a fast dental X-ray film, a medical X-ray film for use without fluorescent intensifying screens, an industrial X-ray film, and a fine-grain industrial film (Kodak Type M). Though slow, the Type M film was best because of its ability to render detail.

With an X-ray machine as the radiation source, a cardboard cassette (small box or casket) was used. This was loaded with the film on the bottom and the plated

specimen on top, the plated surface resting against the emulsion of the film.

Hot Source—For X-ray work, the specimens were 4 x 6 in. in size. The cassette was slightly larger so that the flap cover could be pressed down on the specimen and the film by weighting the edges with lead bricks.

When the radiation source was a radioactive material, metal coupons of the active metal about 0.8 x 1.6 in. in area were placed over the plated specimens of about the same size. The film, plated specimen, and radioactive coupon were clamped together in a cassette with the emulsion of the film against the plated surface and the radioactive coupon against the basis metal side of the plated specimen.

Set Requirements—The more important requirements for the radioactive material to be used as a source of radiation are: 1) a half-life sufficiently long for convenient use, 2) a good availability (this usually limits the choice to isotopes that are normally produced in an atomic pile), and 3) radiation of sufficient energy to penetrate the basis metal and of such a nature as to be significantly more absorbed by the plated coating than by the same thickness of air.

Radioactive cobalt, nickel, and iron meet these requirements. These and other radioactive materials may be obtained through the Union Carbide Nuclear Co., Oak Ridge National Laboratory, Radioisotopes Sales Dept., P. O. Box P, Oak Ridge, Tenn.

Plate Cobalt—For one radiation source a steel coupon, about 0.8 x 1.6 in., was plated with about 1 microcurie of Co⁶⁰ from a cobalt plating bath containing radioactive cobalt. The radioactive iron source was a 0.8 x 1.6 in. coupon of relatively pure iron that had been irradiated in an atomic pile to produce Fe⁵⁵ and Fe⁵⁹.

Calculations indicated that virtually all the Fe had decayed during the 2- to 3-year period between the time of irradiation and the time of use. Hence the radiation was almost entirely from Fe⁵⁵ and corresponded to about 1 microcurie.

Nickel Tried—Another radiation source was a steel coupon plated in an "electroless nickel" plating bath containing radioactive nickel. The activity of the plated coupon was of the order of 1 microcurie including the activity due to the usual cobalt impurity in nickel.

The activity of the radiation source should be evenly distributed in order to obtain uniform exposure

TABLE I
Radiations Emitted by Radioactive Iron, Cobalt, and Nickel

Material	Active Isotopes	Half Life	Radiation	
			Type	Energy in MEV
Iron	Fe ⁵⁵	2.9 yrs.	X-ray	0.0059
	Fe ⁵⁹	45 days	gamma	1.10, 1.30, 0.19
			beta	0.27, 0.46, 1.6
Cobalt	Co ⁶⁰	5.3 yrs.	gamma	1.17, 1.33
			beta	0.31
Nickel*	Ni ⁵⁹	8 x 10 ⁵ yrs.	X-ray	0.0077
	Ni ⁶³	85 yrs.	beta	0.067

* The nickel used contained the usual cobalt impurity (about 1 pct) and hence contained Co⁶⁰.

TABLE 2

Comparison of Radiographic Spots with Rust Spots on Nickel Plated Panels Exposed to Atmosphere

Panel No.	Number of Spots on Radiograph	Number of Rust Spots on Panel	Radiograph Spots Matching Rust Spots		
			Number	as % of Total No. of Radiographic Spots	as % of Total No. of Rust Spots
1	4	200	4	100	2
2	7	200	6	86	3
3	20	300	13	65	4
4	20	300	18	90	6
5	23	263	20	87	8
6	9	209	8	89	4
7	70	375	10	14	3
8	212	400	205	97	51

of the film. Fig. 1 is an example of what can happen if the activity is not uniformly distributed. This radiograph of a nickel foil was made using the radioactive nickel deposit as a source. The pattern is almost entirely that of the radiation source and obscures the pattern of the nickel foil.

X-ray Exposure—The time required for exposure is inversely proportional to the activity of the source. Hence it is desirable to have the source as active as is compatible with the available radiation protection and the other facilities of the laboratory. A source of 1 microcurie appears to be satisfactory.

A Picker Army Field Unit with a tungsten target that could be operated between 24 and 100 KV was used for making X-ray radiographs.

No particular difficulty was encountered in obtaining a uniform exposure as long as the entire specimen was well within the radiation cone and perpendicular to the axis of the cone at any given operating voltage. The amount of exposure is controlled by the distance of the specimen from the target (X-ray tube), by the time of exposure, and by the intensity of the X-ray beam. The latter is controlled by the operating current of the machine.

Trial and Error—The optimum exposure is best determined by trial and error. Satisfactory radiographs of 0.0002-0.001 in. nickel coatings on shim steel 0.001-0.003 in. thick were obtained at 24 KV with an exposure of 3 or 4 minutes for a target distance of 93 cm and a current of 30 millamps.

The operating voltage is of considerable importance, since it determines the energy (not to be confused with intensity) of the X-rays. The extent to which the X-rays are absorbed depends on their energy and the absorption characteristics of the material.

Radiographs were made with the machine operated at a number of different voltages, and the best contrast was obtained at the lower voltages, with the softest (lowest energy) X-rays. It is likely that better radiographs would be obtained with X-rays still softer than those obtainable with the equipment used.

Avoid "Accidentals"—Since the discontinuities in the plated coatings of most interest appear in the radiographs as minute black spots, accidental spots are undesirable. The best film processing techniques should be used. In this work, the recommendations of the film manufacturer were followed. The contrast of the radiographs and the ease of interpretation could be

improved by reproducing them photographically.

The reproduction was accomplished by making a negative copy of the radiograph on Kodak Commercial Ortho film and then making a positive print from the negative copy on No. 5 contact paper. Films of higher contrast may be used for making the negative copy, but those that were tried resulted in a much greater incidence of accidental spots.

Check Interpretation—Usually the radiographs have a number of small dark spots on a light background, such as is shown in Fig. 2. These spots may represent discontinuities in the coating or in the basis metal, or they may be spurious. It is necessary to differentiate between these possibilities.

By making duplicate radiographs of the same specimen and comparing the spots on the two radiographs, artifacts were identified. Only spots due to the basis metal or coating appeared in both radiographs.

Spots in a radiograph that did not match up with those in the duplicate radiograph were disregarded. By radiographing, in duplicate, the basis metal before plating and comparing the two radiographs, spots due to the basis metal were identified. The shim steel used was free of radiographic discontinuities.

The radiographic technique can be a useful research tool. Using microradiography, it can be even more useful.

Matching Spots — Though basis metal defects offered no difficulty, the spurious spots were quite bothersome. Matching spots on duplicate radiographs was quite tedious and time-consuming, especially when there was a large number not clearly defined. Such conditions were usual for radiographs of uncorroded nickel coatings.

The smallest pores show up as spots that do not stand out clearly. Often, they are not distinctly different from many of the accidental spots.

The incidence of artifacts varied considerably from radiograph to radiograph, but usually there were 5 or 10 per sq in. Visible gas pits and corrosion pits extending into the basis metal show up very clearly on radiographs. Their size and depth lead to radiographic spots that are clearly defined and not likely to be confused with accidental spots.

The discontinuities in the coating that are detected by the radiographs may be pores, dead-end pores, voids, inclusions, gas pits or corrosion pits. No attempt has been made to classify radiograph spots due to the different types of discontinuities except where the type could be identified by visual examination of the plated coating. Such identification appears to be possible.

Spot Size — The smallest spot on the radiograph that could be detected with the unaided eye was of the order of 0.001 in. This limitation was verified by radiographing an electroformed nickel foil. Examination of the foil under a microscope with a bright light behind the foil revealed numerous pores.

The radiograph had only one significant spot that corresponded to two closely adjacent pores, each of which was about 0.001 in. in diameter. Microscopic examination

showed that none of the other pores was larger than 0.001 in. diam.

Finer Grain — Magnification of the radiograph was not significantly helpful with the types of film used. Finer grained film would permit magnification, and this is an obvious approach for future work.

A simple comparison of the radiographic method with the well-known ferroxyl test was made. For this purpose, a piece of shim steel (4 x 4 in.) was plated with about 0.0005 in. of nickel, radiographed in duplicate with an X-ray machine, tested with ferroxyl paper, and radiographed again.

The ferroxyl test was made by immersing rag bond paper in a ferricyanide solution (15 g per liter of sodium chloride and 3 g per liter of potassium ferricyanide) for a short time, draining it, the pressing it firmly against the nickel coating.

This procedure was repeated three times in succession before the second radiograph was made. Typical blue spots formed on each piece of ferroxyl paper, the number increasing with each test. On the third paper, 130 spots appeared.

The initial radiograph showed no clearly defined spots attributable to coating defects. The post ferroxyl radiograph not only had spots corresponding to each spot on the ferroxyl paper, but had a number of additional ones that were clearly defined.

This comparison indicates that the ferroxyl test creates pores or enlarges pores that initially are too small to be detected radiographically. Also, the ferroxyl test induces or enlarges pits which may not be detected by this test. That is, it attacks the nickel coating, but not always to the extent that will result in sufficient attack on the steel basis metal to yield a blue spot.

Rust Spots — Since discontinuities in the plated coating that are de-

tected with radiographs are likely sites for coating failure, the possibility of using the radiographic method to predict the appearance of rust spots on plated specimens that are exposed to the weather was investigated. Results of comparisons are summarized in Table 2.

About 80 pct of the significant radiographic spots corresponded with rust spots. That this was not always the case may have been due to defects such as dead-end pores or voids in the coating that would not lead to rust spots as rapidly as open pores. The number of rust spots corresponding to radiographic spots increased throughout the exposure test and presumably would have continued to increase.

The last column of Table 2 shows that only a small portion of the rust spots corresponds with radiographic spots. This indicates that failures usually occur at points where the radiographs did not detect discontinuities. This means that either the radiographic method as used is not sufficiently sensitive to detect most of the pores or that failure of coatings also occurs through some other mechanism.

Valuable Tool — From the test, it is certain that discontinuities in metallic coatings plated adherently to the basis metal can be detected radiographically. The radiation source may be between the basis metal and coating, or external to the plated specimen.

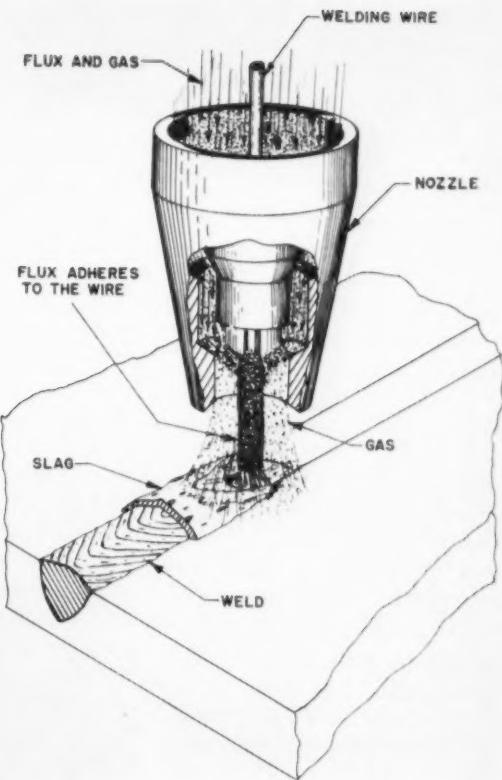
In its present stage of development, the radiographic technique can be a useful tool for research on plating porosity. Its value should be even greater when microradiographic techniques are adapted.

Acknowledgment — Permission of the Project Committee, American Electroplaters' Society, to publish this article is gratefully acknowledged.

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HOW WIRE FEEDS: Motor draws wire from rotating drum, then feeds it to torch through flexible conduit.



PROTECTIVE TEAM: CO₂ and flux work together to produce strong, uniform and clean welds.

New Continuous-Feed Process Cuts Welding Costs

By L. Nielsen—Staff Engineer, Caterpillar Tractor Co., Joliet, Ill.

No more stopping to change electrodes.

Not with this new, revolutionary process that feeds a wire electrode continuously.

Fast and dependable, it naturally cuts your welding costs.

- A new manual arc welding process introduces a revolutionary concept to production welding. It makes use of a continuously-fed

wire electrode that is magnetically coated with flux and shielded in a gas atmosphere.

Right now, the process—known as Unionarc welding—is being used to produce high-quality welds in steel. Among other advantages, it can be used in all positions at greater speeds than covered electrodes. Add to this the fact that it actually lowers welding costs.

Now in Production—Though new, the process has been carefully

checked out in actual production at the Caterpillar Tractor Co., Joliet, Ill. Caterpillar began its evaluation of the process about a year ago.

During the testing and proving period, Caterpillar's engineers worked closely with the process' developers—Linde Air Products Co. This collaboration resulted in the incorporation of a number of significant design changes.

Perhaps the most important change was in the design of the torch. In the original model, the

torch was water-cooled. Water cooling was eliminated by providing for enough air-cooling to meet welding conditions and by using a heavier cable. This change lowered processing costs considerably.

Careful Tests — In initial tests, about seventy all-weld-metal specimens were made to see if the process would meet rigid manufacturing specifications. More than fifty satisfied minimum requirements. Examination of failures showed that the cause was either improper weld technique or excessive moisture in the CO₂.

Once satisfied that sound welds could be produced consistently, an average production welding operator was instructed in the use of the equipment. Production assemblies were then made while testing the new process. After awhile, it was evident that the new process would greatly reduce hand, open arc welding applications, and in some cases replace semi-automatic submerged arc welding.

The "C"-frame used to attach the bulldozer blade to the tractor was chosen as the first production assembly to be made with Unionarc welding. Time-study figures previously indicated very good dollar-saving possibilities.

Applications — Principal applications for which the new welding process is being used include welding of the back bearing and brackets on the "C"-frame assembly and welding a sub-assembly for cable control cases.

In the new welding process, a bare wire electrode of common steel composition is continuously fed from a 300-lb. capacity pack through a flexible tube to the torch. The operator starts and continues welding to suit his requirements. There is no frequent stopping to change electrodes nor a series of starts and stops in making a joint.

The wire is supplied in a "Pay-off Pak," covered to keep the wire clean. The pack is supported and rotated on a motor-driven turn-table, controlled so that wire ten-

sion at the feed rolls is minimized. The large wire pack provides at least one week's supply with average welding conditions.

New Flux — Specially compounded magnetizable flux is placed in a dispenser and fed from this point through a flexible tube to the torch. The dispenser is designed to measure exactly the amount of flux in proportion to the amount of wire that is being fed.

The dispenser can be adjusted to feed different flux-to-wire ratios, but the usual ratio is between $\frac{3}{8}$ to $\frac{1}{2}$ lb of flux per pound of wire. This predetermined ratio is automatically maintained regardless of the rate of wire feed.

The flux is fluidized at the dispenser in a stream of welding-grade carbon dioxide gas. The gas, supplied from the usual commercial containers, is regulated as to pressure and flow and carries the flux to the torch suspended in the gas stream.

At the torch nozzle, the magnetic field created by the electric current passing through the wire, magnetizes and attracts the flux to the wire. As a result, the wire is "coated" as it is fed into the arc.

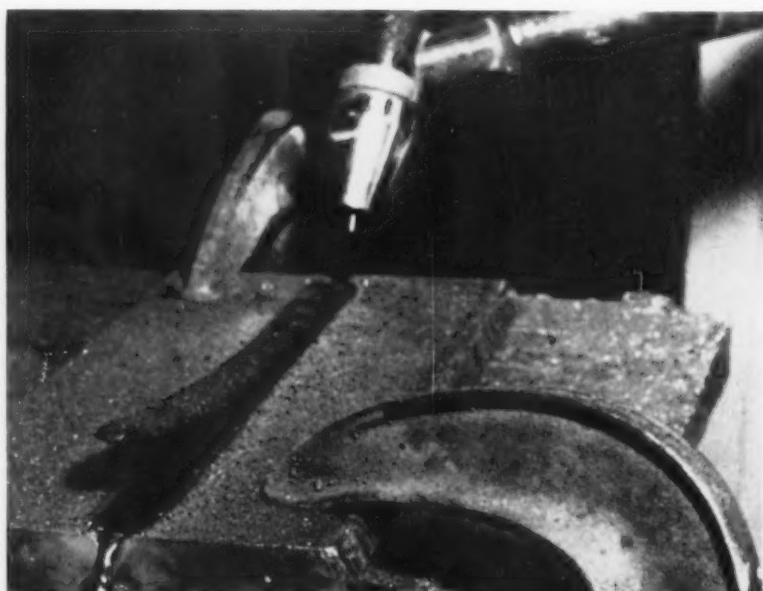
Four Jobs — The flux melts and does four important jobs. Together with the shielding gas, it stabilizes the arc and the stream of molten metal passing through it to the puddle, and protects the puddle from atmospheric contamination. It also refines the metal by deoxidation.

In addition, the flux provides the desired control of weld contour by its effect on surface tension. Lastly, it provides the desired cooling rate of the weld metal by its blanketing and insulating action.

The welding current is supplied by a direct current power source. A constant potential rectifier can be used with the added advantage of assuring easy and uniform starting and control of arc length.

Easily Cleaned — The arc characteristics of Unionarc welding are similar to those of covered electrode welding. Under most welding conditions, metal transfer is "spray-type," and very little spatter is evolved. The small amount of spatter produced by this process is not tenacious, and can be readily removed by wiping or light brushing.

The welding techniques used with this new process are comparable to those employed with the most



SLAG LIFTS OFF: The Unionarc process cuts down post-weld cleaning time. As the weld cools, the slag frees itself from the work surface, leaving it in a relatively clean condition.

commonly used covered electrodes. After a few hours practice—as was proven at Caterpillar—an operator familiar with covered electrode welding can produce excellent welds. Manual skill and dexterity requirements are equivalent to, or are less than, those for covered electrode welding.

The sequence of starting and stopping the flow of current, wire, flux, and gas, as well as maintaining proper welding conditions is regulated through an electronic control unit. The components included have been proven by years of experience with this type of control.

Fast Rate—The new process deposits weld metal at a rate that is 50 to 100 pct greater than that obtained with covered electrodes on the most common downhand welding applications. In the vertical and overhead positions, deposition rate is 2 to 3 times as great as that of covered electrode welding.

Because the process utilizes a continuously-fed electrode, the operator can devote more time to actual welding. The higher operating factor in combination with greater welding speeds reduces unit labor and overhead costs.



UNIFORM WELD: Without too much training, an operator can easily make sound, uniform welds. Here, a casting is welded to "C" frame.

High Strength—According to tests conducted by Linde, the process' developers, the welds exhibit excellent mechanical properties. Typical mechanical properties on A-212 steel are 75,000 to 85,000 psi tensile strength, 65,000 to 70,000 psi yield strength. Elongation in 2-in. is 25 to 35 pct., reduction in area is 60 to 70 pct, with an impact of 15 ft-lb at —40 deg. F.

Based on Caterpillar experience, some of the more evident advantages of the new process over stick electrode welding are a better quality weld due to added penetration, less distortion of welded assemblies, higher deposition rates, less cleaning time, constant arc length, the near elimination of undercutting, and a cleaner shop due to the elimination of electrode stubs.



PLENTY OF METAL: Several factors contribute to a high deposition rate for Unionarc welding. Among these are: high current density, automatic wire feed.



"C" FRAME: Assemblies such as this bulldozer part make good use of the new process. With it, welding can be done in all positions.



LESS FATIGUING: Standing doors upright simplifies chipping off of old ore lining, welding new studs.

Central Relining Station Boosts Openhearth Door Life

Maintenance crews are human. When the pressure's on for production, the fine points of quality may become blurred over.

But the production-up, quality-down seesaw needn't be. Put the proper hinge at the fulcrum and both can rise together.

For this openhearth shop, a central door-relining station has proved a proper hinge.

■ Steel mill maintenance crews are only human. When production pressures build up high enough, something's got to give. They'll get the work out as best they can. And

it will continue meeting basic quality requirements. But it won't be the best-quality work that more leisurely schedules would permit.

Of course, you can throw in more men or equipment. But there's a point of diminishing returns in beefing up existing facilities.

Sometimes, a fresh approach meets the problem better.

Falling Behind—Gary Works of U. S. Steel, back in 1953, found its individual openhearth shops unable to keep up with demands for re-lined furnace doors. The constant pressure for doors had maintenance crews taking shortcuts—failing to clean doors properly before relining, making inadequate provision

for venting the lining, allowing insufficient drying time. Life of linings was erratic. Relining facilities were cramped. There wasn't enough preparation space. Crane service was inadequate. There was a lack of close supervision.

Gary's answer: a large, central relining station which now handles all doors from the four shops' total of more than 50 furnaces.

The changeover has paid off in a consistent, substantial increase in door lining life. Average number of heats per door lining for all of the steel furnaces is up 35 pct over what it was when the program began.

Less Downtime—Average num-

ber of doors lined per month has decreased proportionately, with a resultant savings in door lining material and labor costs. This has meant fewer door changes, less furnace fuel-off time, and reduced work load on charging floor cranes. Net effect has been a step-up in steel production rates.

Six men, working a single shift, now turn out from 8 to 10 doors a day. The station is under the supervision of the open-hearth maintenance department, and is located in an area serviced by an overhead traveling crane, for fast, simple door-handling.

The men on the crew switch jobs informally, except for the gang leader. Men are added, or assigned elsewhere, as needed.

Work Sequence—The work cycle starts when doors are positioned in portable racks of 12-door capacity. When racks are full, they're carried to the relining station on skull cars pulled by engines. The relining station accommodates one rack from each shop.

Doors then go on cleaning stands. These support doors at an angle of about 75°. The men chip off old chrome ore refractory lining with a compressed air tool. An oxyacetylene torch burns off old studs, used to support the lining, flush with the lining plate. Doors then move to the studding stand, where Nelson studs are end-welded to the doors.

The studs serve a double purpose on the monolithic-lined doors. They physically support the lining, so it won't fall out or slump. At the same time, they conduct heat through the lining plate to the cooling water.

Left Standing—Doors were originally laid flat for studding. But it's been found that the stud-welding operator doesn't tire as quickly and welds more studs with doors in an upright position.

A standard door takes 280 studs on 3-in. centers. Most Nelson studs used are $\frac{1}{2}$ in. in diam, $4\frac{1}{2}$ in. long. Experiments are being run with $\frac{3}{4}$ -in. diam studs, which have $2\frac{1}{4}$ times the cross section.

After studding, doors are laid flat and connected to a steam manifold to check for leaks. The plastic chrome ore is then shoveled into the doors, worked between the studs and finally rammed with a pneumatic tamper. Two complete passes of the tamper over the surface usually produce maximum density. The lining is then vented. This is done with a home-made tool with five $\frac{1}{4}$ -in. diam prongs on $2\frac{1}{2}$ -in. centers.

Dry 48 Hours—The crew then stacks doors four-high for drying. A steam manifold runs the length of the drying line, with door inlets and outlets connected. This allows steam to enter the top door and exhaust through the bottom door. Drying time's at least 48 hours.

Gary's experience shows that steam entering the doors should have a temperature of at least 275°F, if linings are to dry properly. And proper drying is important in lengthening door life (actually, steam temperatures as high as 475 to 525°F are recommended, if these are available).

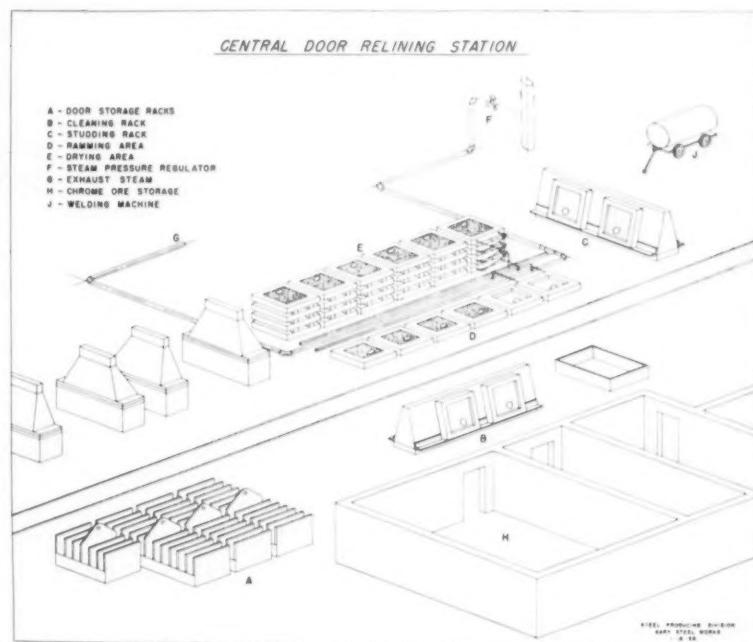
Doors are dried for 48 hours,

then tested by tapping with a hammer. A ringing sound shows the lining's dry. A dull thud indicates that the inner portion of the lining's still moist.

Checking Costs—The relining station has its own cost center. All materials, tools and supplies used in the operation are charged against the cost center, making an accurate determination of the cost of relining doors possible. In effect, the individual openhearth shops purchase relined doors from the relining station.

Accurate records are kept of door lining life. This has been done since shortly after the central relining station program was set up. Each time a door is relined, the gang leader marks down the blend of chrome ore, the door size, type of door, and type of studs. Records are also kept of the date each door was purchased and the date it was scrapped. Lining life is summarized each quarter.

Vital Data—Gary believes these accurate records are vital in evaluating experiments and contribute to improving lining life.



ONE FOR MANY: Replacing individual shop setups with this central openhearth door relining station licked problems of cramped quarters, inadequate crane service, lack of close supervision.

Let Magnets Clean Up Rolling Mill Coolants

By A. L. Wilson, Jr., Barnes Drill Company Rockford, Ill.

A certain "rock bottom" amount of maintenance expense is a must on any operation. Or is it?

With rolling mills, you just accept the necessity for frequent tank clean-outs to remove coolant contaminants. Or do you?

You don't—where there's a better way. For cleaning cold-mill coolants, that may be magnetic drums.

For years, rolling mill men have followed a standard procedure in handling problems of contaminated cold-rolling-mill coolants. They simply let contaminants build up till they reached the point where coolants were no longer usable. Practically all mills adapted by-pass filtering systems to slow the process. But—at best—these only prolonged intervals between tank clean-outs.

Within the past year-and-a-half, magnetic separators have proven remarkably effective in helping cut these costs. In some mills where weekly tank clean-outs were necessary, times have been prolonged to as long as four months. And less coolant's required.

Result of these and other benefits: Major mills are already using two magnetic separator systems; have several more on order.

Start With Contaminants—What are the major arguments for making magnetic separators the major cleaning device on coolant systems servicing ferrous rolling mills? For an answer, start with contaminants. Generally, these break down into four categories:

(1) Magnetically responsive "slough off" from the material being rolled.

(2) Magnetically inert material from the guides, wipers, holddowns or other handling equipment.

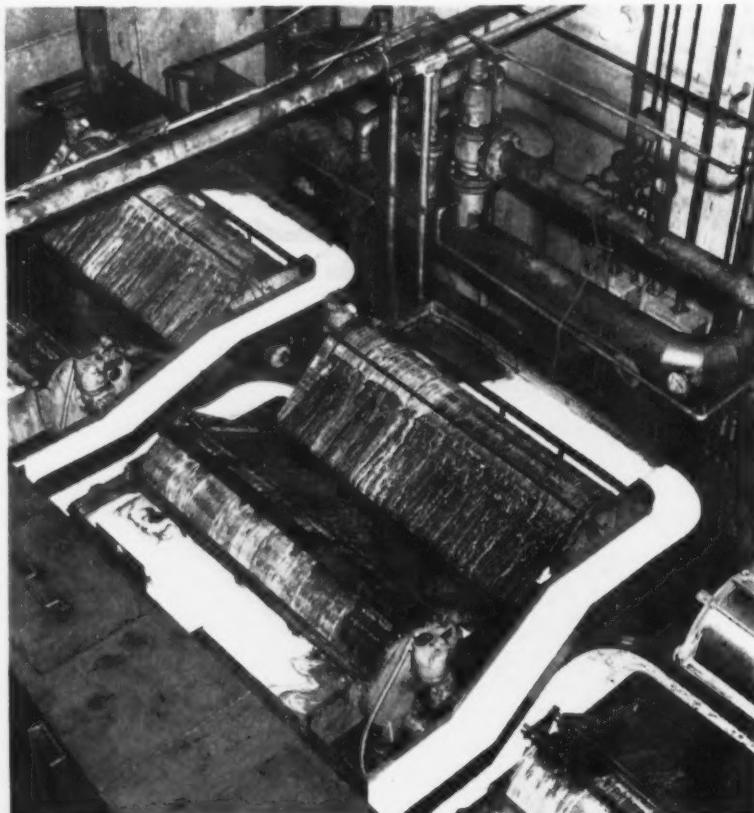
(3) Tramp oil, or oil waste from the normal lubricated joints of the mill, from bearings, drive mechanism, or other equipment.

(4) Nondescript trash—floor dirt, paper, dust, etc.

Two Down—Good housekeeping

practices will eliminate the fourth category to start with. Group 2 is, of course, magnetically inert, and must be handled by some positive filter. It's because of this material that existing filters should be retained, or installed, if need be, when magnetic separators are added.

Groups 1 and (surprisingly enough) group 3 can be effectively removed by drum-type magnetic separators. Some pre-rolling processes utilize blast-type descalers, which leave a powdered formation



EFFECTIVE SYSTEM: Magnetic coolant separator sits atop tank for a cold-rolling mill. Dirty coolant comes in through down flume (left), feeds through troughs to separators, hence to coolant tank.

on the sheet. If the powder isn't loose at the time of rolling, it will fracture itself from the body of the sheet as it passes through the rolls. Also, the "sliver" or some loose scale may be found in this magnetically responsive material.

But why should tramp oils be effected?

Field experience in major mills shows that these group 3 tramp oils have an affinity for the surface of the magnetic drum. There are instances where some of the very fine ferrous particles become suspended in this oil. The agglomerated mass then clings to the drum. Where this occurs, the drum will remove the bulk of the tramp oil for extraction along with the contaminant.

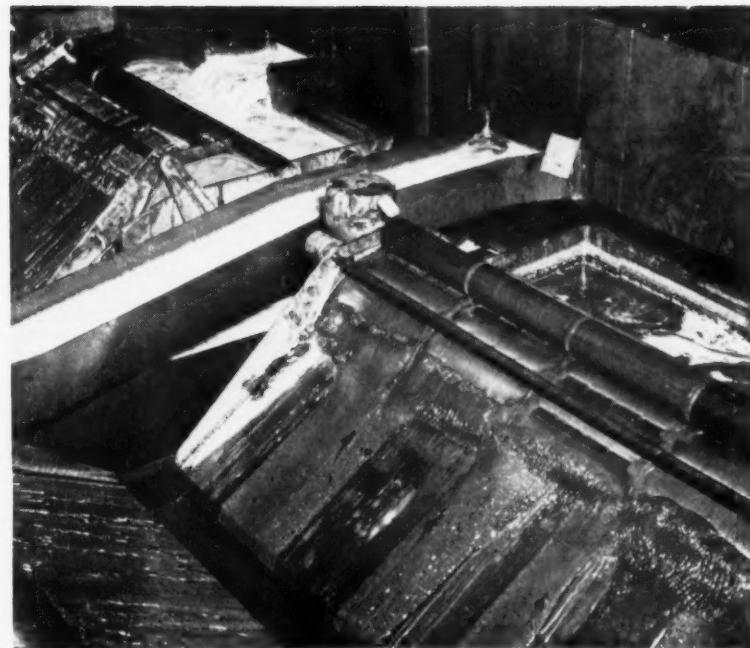
How Effective?—Magnetic separators are recommended as "full flow" installations; i.e., with all the mill coolant load passing through the concentrated magnetic field of the separator as coolant comes down from the mill stand to the storage tank.

Over an eight-hour working day, the mill coolant goes through the cleaning device some 480 times. The mathematical probability is very great that an individual particle of ferrous contaminant will be stopped in this time. Incidentally, don't go by a "one pass" efficiency yardstick in evaluating equipment efficiency—it's meaningless because you never twice have the same circumstances.

Thus the contaminant load entering the separator might be at 0.115 pct (by weight) at one time and at 0.009 pct at another. Assuming 65 pct efficiency from the separator, 35 pct of these solids would pass into the tank.

The Fallacy—The fallacy of figuring efficiency this way is that, with relatively high contaminant loads, efficiency of magnetic separation goes up. This suggests that the lowest level of contaminant that will be maintained in the entire system would be a more accurate measure of equipment effectiveness.

In one case, a rolling mill has been operating with a solids con-



REMOVE TRAMP OIL: Drum-type magnetic separators can efficiently take tramp oil as well as magnetic contaminants from dirty coolant.

tent which occasionally reached 0.238 pct (by weight). A simple calculation shows that this is approximately 20 lb of solids per 1000 gallons of coolant. After magnetic separators were installed on this mill, the contaminant load was held at 0.018 pct by weight, or approximately 1.5 lb per 1000 gallons.

This would represent a reduction of the contaminant load by some 87 pct. Yet we know that "one pass" magnetic separation does not reach this efficiency with particles of contaminant of the size found on these mills (44 microns or less).

Installation—How should separators be installed? Typically, they're mounted on top of the coolant tank. In small systems (under 100 gallons) a single separator suffices. Larger systems call for multiple units mounted in tandem with a screw conveyor between the banks of separators. This screw conveyor removed the separated contaminant from the separator discharge point to the waste container. The down flume from the mill usually directs the coolant into a distributor system. This feeds each separator its part of the entire coolant load.

Coolant then passes through the separator to the coolant tank.

Cleaning Costly—The need for frequent tank clean-outs has been one of the major costs of operating rolling mills with contaminated coolants. Besides cutting this back sharply, the system has cut coolant costs.

It is reasonable to expect considerable savings in another major area.

There are cases where it is costing a plant \$1,500 a year to manually clean pressure filters. Magnetic separators should cut this to a fraction of that figure.

Other Advantages—Additional benefits will include cleaner product, without "filmy" streaks or shadows from contaminants and, possibly, an increase in life of roll oil seals and bearings.

There are, of course, limitations. An Alnico magnet will quickly show whether magnetic separation is practical. Too, consideration can be given only to coolants which are homogeneous in the quiet state. The mineral oils and the emulsions are the best media.

How Much Do Grinding Fluids Affect Wheel Performance?

By J. A. Mueller—Manager, Bonded Abrasives Grinding Lab., The Carborundum Co., Niagara Falls, N. Y.

Grinding wheel performance depends on both the fluid you use and the way it's applied.

You can use a flood, a mist, a jet stream or a steady flow through the wheel itself.

Here is how the various techniques rate on those factors that lead to maximum grinding efficiency at the lowest cost.

■ As the previous article in this two-part series pointed out, the general classes of grinding fluids—gases, water soluble oils and grinding oils—affect grinding wheel performance to a considerable and varying degree.

A large number of tests made by The Carborundum Co. demonstrated this, as was shown. The tests, however, were made without regard for the manner in which the fluids reached the grinding area.

But modern grinding practice uses a number of methods to bring fluids to the point of grinding contact. Each one also affects grinding wheel performance and efficiency to a marked degree. Among these methods are mist application, the technique of applying fluid through the wheel itself, and the use of jet streams.

In another series of tests, The Carborundum Co.'s Bonded Abrasives laboratory studied these different methods to see how they influenced wheel performance. Particular attention was paid to effect on metal removal, wheel breakdown, workpiece finish, production rate and power consumption.

Covers Wide Range — To be applied in mist form, a fluid is first combined with air in some type of mixing chamber. The resulting mist is then directed to the grinding area through a nozzle orifice. Mist cooling can range from virtually an all-fluid-no-air mixture to one that uses practically all air and no fluid. In practice, the best mixture usually lies somewhere between these extremes.

The method makes effective use of these basic concepts: (1) air in the mixture expands rapidly as it leaves the nozzle orifice to lower the temperature of the surrounding air; (2) the mist itself evaporates and absorbs heat from the piece being ground; (3) air passing through the grinding area carries heat away with it; (4) for maximum effectiveness, the fluid is directed into the grinding area at high velocity.

Makes Wheel Hard—The cut off operation best illustrates the effect of mist cooling on wheel performance. Fig. 1 shows that in cutting C1020 steel with a resinoid bonded wheel, use of $\frac{1}{4}$ pint of cutting fluid per hour reduced wheel wear 66 pct by making the wheel act harder. The same effect is found on stand grinders using resinoid bonded wheels. Mist keeps the wheel cool and increases its efficiency.

Where vitrified wheels are used in precision grinding, mist cooling is a compromise between conventional wet and dry techniques. By cutting down on the amount of fluid, it makes a wheel normally used for wet grinding act harder. By the same token, it makes a

wheel normally used for dry grinding act softer.

A major advantage of mist cooling is that it does not require an elaborate coolant system and all the accessories. The technique lends itself to those situations where some cooling and lubrication are beneficial, but the machines do not have wet grinding equipment.

Adapts Easily—One example is a tool and cutter grinder. Adapting mist cooling to the machine will not interfere with grinding. Conversely, it permits easier and faster sizing of intricate shapes or long pieces of heat sensitive materials. It does not splash, and it gives the operator an unobstructed view.

This is the second article of this two-part series. Part I, which dealt only with the effect that various classes of grinding fluids have on wheel performance, appeared in the February 28 issue.

FIG. 1

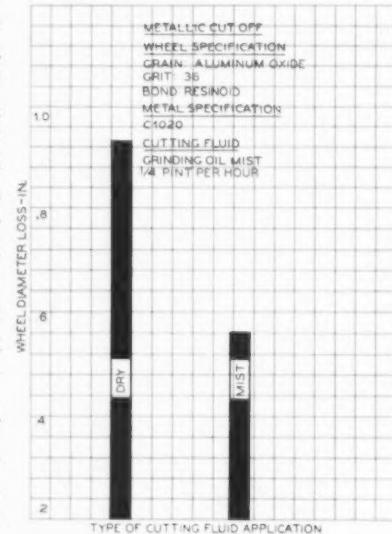


FIG. 2

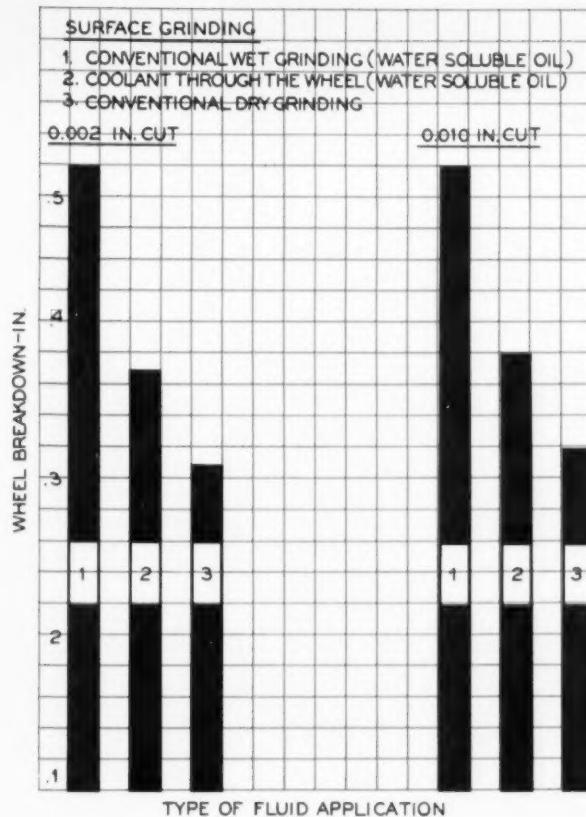
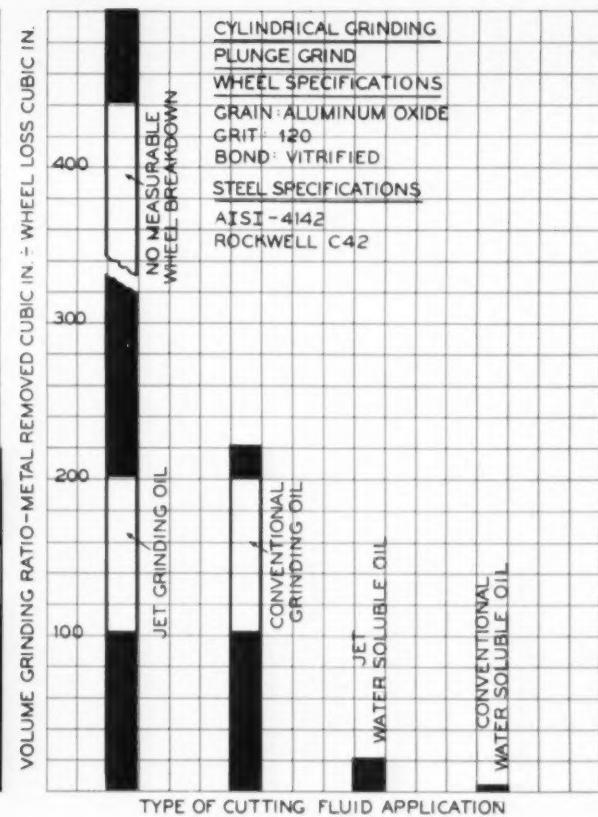


FIG. 3



Putting coolant through the wheel generally involves either of two procedures: (1) pumping a fixed amount of fluid through a recirculating system into a hollow spindle and permitting centrifugal force to help carry it through the wheel; (2) introducing coolant into a special set of flanges and then, without pumping action, allowing centrifugal force to push it through the wheel.

Recirculating a quantity of coolant through the spindle means that it must be filtered to prevent swarf from plugging the wheel voids. Putting coolant through the flanges avoids this problem because the small amount of fluid used is not recirculated. It is not uncommon to use as little as $\frac{1}{4}$ pint per hour.

Fig. 2 shows the effect on wheel breakdown of putting water soluble coolant through flanges at 120 drops per minute, as compared with conventional flood and dry grinding. Two infeeds were tried, one a

light cut of 0.002 ips, the other a heavy cut of 0.010 ips.

Dry is Best — On this test, dry grinding held the wheel form best. Wet grinding broke the wheel down most rapidly. Putting coolant through the flanges was between the other two methods in terms of time required for wheel breakdown.

Thus, carrying coolant through flanges and wheels is a compromise. It provides some cooling when machines are not equipped with wet grinding accessories, and it does not inconvenience the operator. A rate of 120 drops per minute will visibly wet the workpiece without obscuring it or messing up the machine. Finishes are essentially the same as in conventional wet or dry grinding.

To gage the effectiveness of applying fluids by means of a jet stream, Carborundum researchers used a typical cylindrical grinder. It was equipped with a standard 120-grit aluminum oxide wheel,

dressed to a width of 0.200 in. The work tested was AISI 4142 steel.

Grinding fluid was brought directly into the point of work-wheel contact through a nozzle with three orifices, 0.030 in. in diam and equally spaced 0.100 in. apart in a straight line. A 1-gpm pump produced a pressure of 400 psi.

Oil Jet Tops — Fig. 3 shows the grinding ratios produced by the jet method as well as by conventional flooding with both grinding oil and water soluble oil. The jet stream with either type of fluid improved the ratio at least five times above that achieved by flooding with the same fluid. Significantly, however, flooding with grinding oil produced a higher ratio than a jet stream of water soluble oil.

In additional plunge grinding tests on the 4142 alloy, a jet stream of grinding oil was most effective in helping the wheel to hold a corner. Flood grinding with oil also worked well.

Small Shear Replaces Dies On Short Runs

By T. M. Rohan—Cleveland Regional Editor

It takes time to make blanking dies for short runs of small, straight-sided parts.

But here's a 24-in. shear that will handle such work at a fast 120 strokes per minute.

For working with coiled strip, several shears can be linked in an automated setup. Single machines can do slitting, also.

■ A hurriedly designed, small, high-speed shear—put together for harried World War II planemakers—is making a postwar comeback in redesigned form. And the new model threatens to eclipse the wartime record of its predecessor.

The original machine was designed from scratch at the request of aircraft manufacturers. They didn't want to waste time making blanking dies to produce lots of 150 to 500 straight-sided shapes. To fill this need, over 100 of the small shears were built. They were fast machines, operating at 120 strokes per minute.

Many of the original models are still used by small stamping shop operators who swear by them.

Last year The Lodge & Shipley Co. of Cincinnati, at the suggestion of long-memoried plane production men, acquired manufacturing rights and redesigned the machine.

Demand Heavy — Before specifications were complete, two were ordered. Within the next three weeks, the backlog was up to 30. At present, all of these machines have been shipped and are proving themselves in service.

Two thirds of the new shears have gone directly into airplane

plants. Others are in use or on order for electrical equipment manufacturers, small shops, laboratories and design groups. One will be used by a toaster manufacturer to make pilot runs on new models until regular production lines can be changed over.

Potentially the biggest market appears to be the continuous, automated production of odd-shaped pieces by a row of the small shears working on coiled strip stock. Lodge & Shipley engineers believe that this will be entirely practical if a sufficient volume of work can be accumulated to justify the investment.

Saves Many Ways—Other top prospective users are those shops that have only a large shear and must use it for everything, including small workpieces. Although it is something like cutting out paper dolls with a hedge clipper, 10-ft shears are frequently used to cut out small pieces. This is simply because the large unit is the only thing available and it will do the job, no matter how uneconomically.

Lodge & Shipley, who also produce large steel plate squaring shears, has studied some of these operations. The company finds that it often costs more to pick little pieces off the discharge table than they're actually worth. In many cases, only two feet of a 10-ft long shear blade will be used regularly, but resharpening must be done on the entire length.

The new 24-in. shear pictured here has a base price of about \$3500. It handles mild steel up to $\frac{1}{8}$ in. thick, stainless steel to $\frac{3}{32}$ in., 75-ST6 aluminum to $\frac{1}{8}$ in., 14-ST6 aluminum to $\frac{5}{32}$ in., and

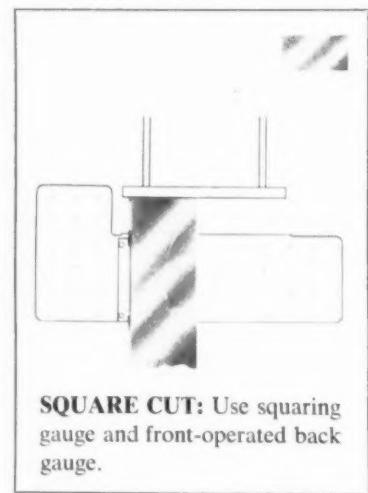
duraluminum to $\frac{7}{32}$ in. thick.

Although the new model is a lineal descendent of the World War II machine, it has been dressed up for quicker, more efficient work on a variety of odd-shaped parts.

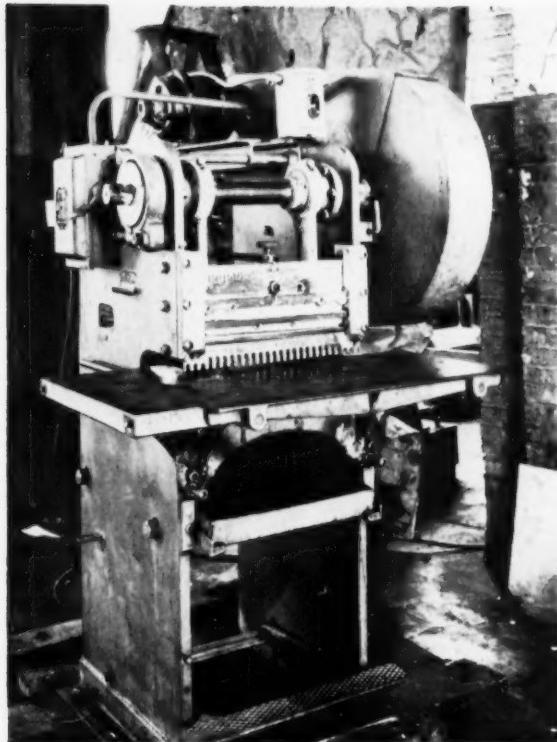
Repeats are Easy—Among the new features is the more versatile work table with its numerous drilled and tapped holes. These permit guides, templates or protractors to be bolted to the table so that any number of pieces can be sheared in duplicate. There is no need to scribe each piece individually. Setups for precise angular shearing are made quickly and precisely with a 180° protractor.

Multiple operations can also be set up on the work table at the same time. The number depends on the size of the workpiece.

Another feature of the redesigned shear is an adjustable ram for slitting operations. When it is used in conjunction with the standard 10 $\frac{1}{4}$ in. throat and the fast 120-stroke-per-minute speed, slit-



SQUARE CUT: Use squaring gauge and front-operated back gauge.



STILL DOING JOB: Small shears such as this are still banging out parts for small stamping plants.

ting coiled stock becomes both practical and economical.

For added convenience, the new shear can be adjusted to discharge cut pieces either to the front or to the rear. A space-saving benefit of the front-discharge arrangement is that the shear can be placed against a shop wall. Moreover, the discharge chute will accommodate a

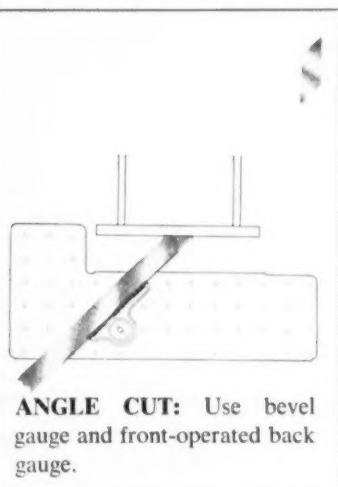
tote pan to speed the handling of small parts still more.

Shock is Less—Another innovation is a patented counter-thrust arrangement which absorbs the cutting thrust through the machine itself. This permits close blade adjustment. Controls for the shear are all electric.

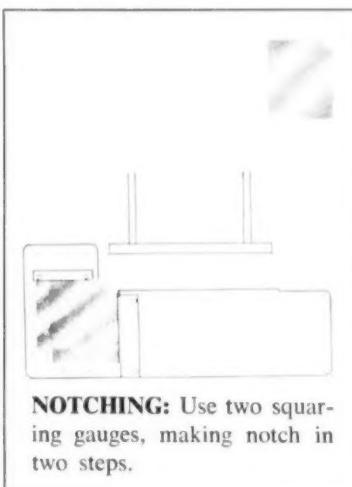


NEW MODEL: With refinements, this new blanking press is rapidly gaining favor on short runs.

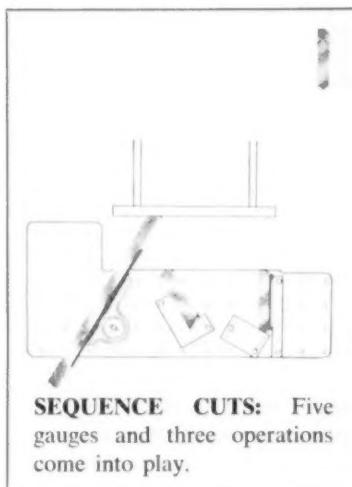
A crank at the front of the shear adjusts the back gage, and an easy-to-read dial, graduated to $1/64$ in., aids precise positioning. Hold-down fingers are mounted on a dovetail bar to permit sliding them to any convenient position. A clear plastic finger guard keeps the operator's hands away from the blade but allows him an unobstructed view.



ANGLE CUT: Use bevel gauge and front-operated back gauge.



NOTCHING: Use two squaring gauges, making notch in two steps.



SEQUENCE CUTS: Five gauges and three operations come into play.

Carbide Machine Ways Solve Abrasive Wear Problem

Armed with modern super-hard materials, shops comfortably take on the all-but-impossible tooling problems of 20 years ago.

But grinding carbide tools is rough. Mixed diamond-wheel, carbide dusts chew up conventional steel machine ways fast.

Switching over to carbide ways proved to be the answer for one firm.

■ Diamond and carbide dusts are a rough-to-take mixture for the moving parts of any machine tool.

The Atrax Co., carbide toolmakers of Newington, Conn., found the mix was just too hard on its grinding machines. The company uses diamond grinding wheels extensively; builds virtually all its own machines to assure best possible performance and quality in

making carbide tools. Steel ways with ball bearing raceways were being used — and chewed themselves up on the dust in about two months.

Replacing them was costly. Putting in fresh 12-in. ways ran about \$50, and was expensive in terms of machine downtime.

Different Approach—Solid carbide ways have proved the solution. Carbide replacements put in more than two years ago cost only \$20, have lasted without maintenance or replacement. And the carbide ways can do double duty before replacement — simply turning the carbide 180° provides a new bearing surface. High-speed steel rod can also be used sometimes, says Chief Engineer P. Niederfringer.

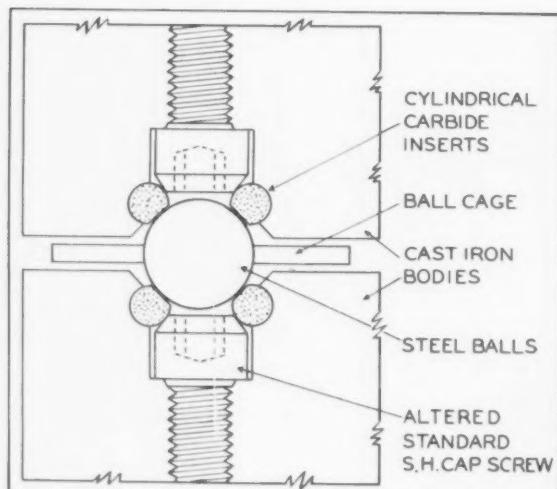
The carbide inserts are used for both gravity- and spring-loaded units, with gravity types giving slightly better wear performance. With either installation, the carbide

ways outlast steel by a factor of at least 15 or 20 to 1.

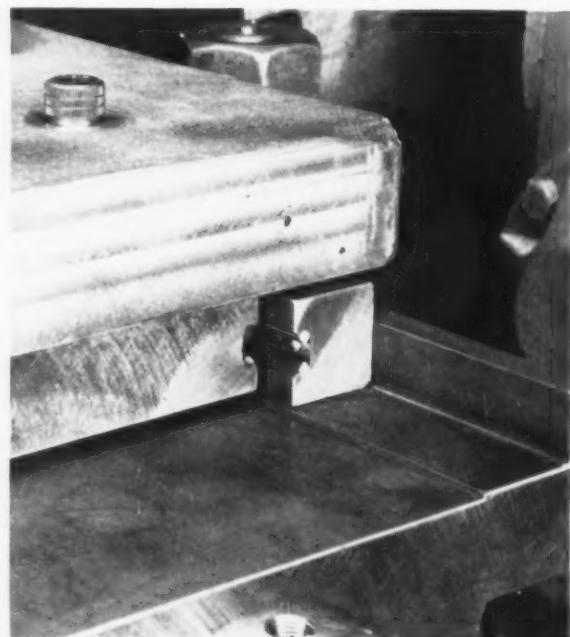
Getting Started—Raw material for the ways is cylindrical carbide burr blanks. These are generally 1½ in. long by ¼ in. in diam, though other sizes may of course be used as needed.

Atrax finds that its ball-bearing construction proves fears of trouble at rod ends groundless: the balls provide suitable contact along the ways even if some are resting rod ends. The carbide blanks are merely slid into position, then ground flat along the line tangent with the ball bearings. When the rod is turned, the grinding operation must of course be repeated on the fresh surface.

Final Touch—Only other change needed is grinding clearance on the heads of the standard socket head cap screws which are shown in the drawing.

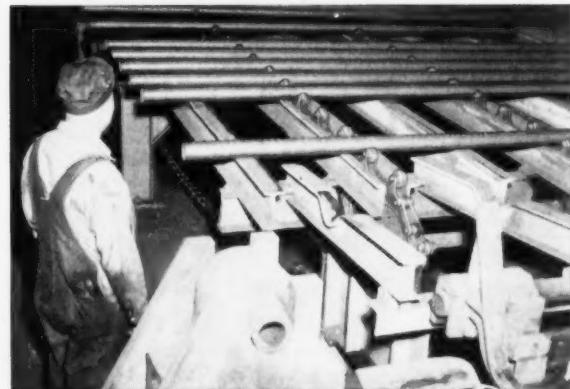


ABOVE: Drawing shows how carbide ways fit into cast iron machine body. Less wear saves on downtime.



RIGHT: Horizontal carbide ways on this automatic bar grinder outlast steel by at least 15 to 1.

Specify longer-lasting Link-Belt Promal chains for extra durability



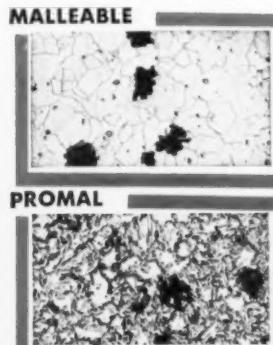
Promal chain controls uniform cooling of pipe

An inclined conveyor, using Link-Belt Class 1100 Promal chain with attachments, permits an Ohio steel mill to control cooling of longer tubes than previously possible. Pipe is received from hot finishing operations at temperatures up to 1800 F. Controlled chain speed permits uniform cooling of outer tube periphery.

HEADQUARTERS FOR CHAINS, SPROCKETS
is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Write for 342-page Catalog 950.



LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities, Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



MICROPHOTOS show difference between ordinary malleable iron and Promal. Upper—white areas in malleable microphoto represent "free-iron"; black shows soft nodules of carbon. Lower—the dark areas in the Promal structure show stronger, stiffer reinforcing material which strengthens metal and resists distortion and wear.

UP TO 475 TONS of steel mill scale are recovered by this Link-Belt system. Class 700 Promal chain on Straightline Collector moves scale from settling tanks to discharge conveyor. Promal is especially suitable for long, heavy-duty conveyors and elevators.

Specially heat-treated malleable iron provides extra wear resistance

Fewer conveyor shutdowns and minimized replacements are economics realized by users of Link-Belt Promal chain. Its greater strength absorbs continuous impact loads—and wear resistance supplies the durability to cope with severe abrasion.

Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable capacity to withstand abrasion. For unusually abrasive or mild corrosive conditions, Promal chain can be furnished with "file-hard" surfaces. Copper bearing or special alloy content also available.

Where and how to apply Promal in the metal working industry

Choose Link-Belt Promal chains for highly abrasive conditions—for extra strength and wear resistance demanded by heavy loads or long, sliding conveyors. They last much

longer . . . cost but a little more.

The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.

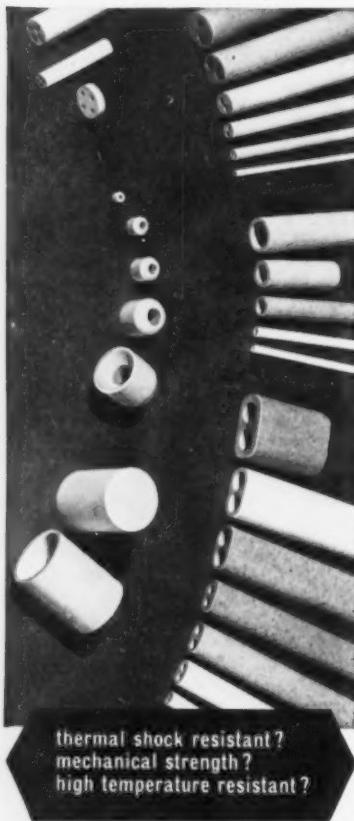


HEAT-RESISTANT PROMAL is recommended for temperatures up to 1000 F. This SMGL-618 Promal chain conveyor with riser attachments picks up and conveys sheet steel through furnace. Chain has operated continuously for two years without failure.

LINK-BELT
THE SYMBOL OF QUALITY

CHAINS AND SPROCKETS

Insulators for Thermocouples



thermal shock resistant?
mechanical strength?
high temperature resistant?

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One or more of these SERV-RITE thermocouple insulators will take care of your needs. If not, there are many more in Gordon's large stock for quick delivery. If you need something entirely special, it can be made to suit your specific requirements.

In the 50 years that Gordon has been supplying thermocouples and accessories to industry, emphasis has been on uniform top quality, service, and value. And so with insulators for any thermocouple application, SERV-RITE assures you of plus values every time.

Write for full information on SERV-RITE thermocouple insulators.

Ask for Bulletin 300-56

This new 4-page bulletin gives specifications and ordering data on all Gordon standard SERV-RITE thermocouple insulators grouped for easy selection.

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 145.

tries. It describes a typical system on packaging machinery. (The Bijur Lubricating Corp.).

For free copy circle No. 3 on postcard, p. 145

Oscillograph

Recording oscillographs are covered in a 16-page booklet. It explains a precise and reliable means of recording static or dynamic data. (Consolidated Electrodynamics Corp.).

For free copy circle No. 4 on postcard, p. 145

Fork Lift Trucks

In 20 pages, a brochure covers the design, engineering, construction and operating features of fork lift trucks, towing tractors and platform trucks. It uses photographs and illustrations liberally to help tell its story. Dimensions and specifications of each unit are included. (Allis-Chalmers Mfg. Co.).

For free copy circle No. 5 on postcard, p. 145

Reactors

Design and application data on current-limiting reactors are available in a 16-page booklet. The illustrated brochure describes repetitive manufacture, cast-in-concrete reactors for circuits of 34.5-kv and below. (General Electric Co.).

For free copy circle No. 7 on postcard, p. 145

Silicon Rectifier

Application notes on silicon high current rectifiers appear in an 11-page publication. (Semiconductor Products, General Electric Co.).

For free copy circle No. 2 on postcard, p. 145

Automatic Lubrication

How automatic lubrication cuts packaging costs is illustrated in a 6-page publication. It presents important reasons for the current trend toward use of automatic lubrication equipment in various indus-

Laboratory Ovens

Recent developments in lab ovens, centrifuges and reagents are reviewed in a company publication. It also contains items on various scientific developments. (Fisher Scientific Co.).

For free copy circle No. 8 on postcard, p. 145

Dipping Plastic

Dipping and molding plastic material is introduced in a specifications sheet. The coating resists alkalies and acids and is tough and resilient. It is easy to use, the sheet says. The only equipment needed to mold or dip with the material is a low temperature oven capable of 350°F. (Beckett-Harcus Co.).

For free copy circle No. 9 on postcard, p. 145

Friction Tape

A 4-page catalog features a line of friction, rubber, and plastic tapes. The catalog contains illustrations, reference charts, and descriptive information. (Boston Woven Hose & Rubber Co.).

For free copy circle No. 10 on postcard, p. 145

Fluid Sealing

A 12-page bulletin describes the products of a particular manufacturing company. It outlines facilities available to customers through cooperative research in fluid sealing and related problems. Also described are specialized mechanical sealing materials available. (Chicago Rawhide Mfg. Co.).

For free copy circle No. 11 on postcard, p. 145

Circular Weldments

Circular weldments are featured in an 8-page brochure. It covers: a firm's special products department, diversity of special products' production, basic principles of flash-welding, quality control, and welding facilities. (Dresser Mfg. Div.).

For free copy circle No. 12 on postcard, p. 145

Die Buttons

Because of improved processes, a company is reducing prices, increasing their size range and improving deliveries on die buttons. A new catalog page records these changes. (The Pivot Punch & Die Corp.).

For free copy circle No. 13 on postcard, p. 145

Farquhar
Hydraulic Presses
engineered for
higher profits
even on
short runs!

THE whole Farquhar engineering-designing effort is directed toward making Farquhar Presses extremely efficient *even on short-run operations*. Farquhar's new triple-acting press with electric-magnetic controls is typical of this designing plan. The electric controls of this press provide for fast, easy set-ups and fast, accurate cycle operation—two important advantages that guarantee higher production profits regardless of the size of the run.

We invite you to write for information or ask for our recommendations and proposals.

A. B. FARQUHAR DIVISION
The Oliver Corporation
Press and Special Machinery Department
York 24, Pennsylvania

575-Ton Farquhar Triple-Acting Press with Electric Magnetic Controls. The first of its type with these controls. Advantages: unlimited speed changes—fast cycle time—no cams to adjust—smooth motion to protect expensive dies—4-point blank holder pressure adjustment. For complete facts write for Bulletin A-200.

Special Machinery Built to Your Requirements...

Our staff works with the finest equipment to build your special machines economically. Your inquiry will receive prompt attention.

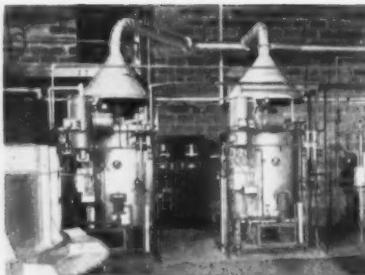
OLIVER

Farquhar **PRESSES**

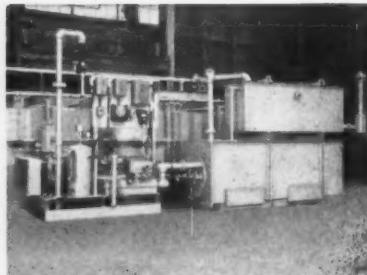
Also Manufacturers of Farquhar Conveyors

FREE LITERATURE

FURNACES and Special Atmosphere equipment



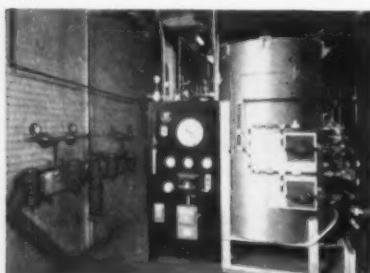
An efficient, low cost installation consisting of two small EF oil fired endothermic gas generators for producing special protective atmospheres from propane for carburizing and other processes.



An EF kerosene exothermic gas generator, built in sizes and types for producing atmospheres for bright annealing copper and steel products in areas where fuel gases are not available.

EF engineers pioneered the development and use of endothermic, exothermic and other low cost special atmosphere treatments for bright annealing ferrous and non-ferrous strip, tubing, wire and other products; for scale-free hardening, carbon restoration, decarburizing and other treatments. Get the exact surface characteristics you want, with unvarying uniformity day after day, by specifying EF special atmosphere equipment. The complete line includes endothermic and exothermic generators, ammonia dissociators, refrigerators, dryers, desulphurizers, gas scrubbing units, CO₂ removal units and other needed equipment. Designed and ruggedly built for efficient, low cost operation. Automatically controlled. Proven in exacting service on hundreds of installations. Sizes for any capacity. For the utmost in efficient, low cost operation, submit your special atmosphere and furnace requirements to EF's experienced engineers—it pays.

EF Ammonia Dissociators are built in many sizes and types for producing highly reducing atmospheres as required for bright annealing stainless; and other processes and preventing decarburization.



EF special atmosphere equipment consisting of an exothermic generator, CO₂ removal unit, a refrigerator type dehydrator, and a dryer for producing a dry, high nitrogen gas with low H₂ content.



BULLETIN No. 461

shows typical installations of EF Gas-fired, Oil-fired and Electric Furnaces.
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Air Control Valves

A 71-page data file offers information on a recently-introduced series of air control valves. It includes dimensional data, a list of parts, descriptive information, a price list and flow diagrams. The series is a group of five pilot heads which are interchangeable with seven valve bodies. (Ross Operating Valve Co.).

For free copy circle No. 14 on postcard, p. 145

Inclining Device

Simple and safe, an air motor mechanism that inclines or brings a press upright over the full range in about two minutes is illustrated in a publication. It shows 59 models with capacities ranging from 16-gage to 1-in. mild steel and cutting lengths from 4 to 20-ft. The 74-page book contains 141 illustrations. (Niagara Machine & Tool Works).

For free copy circle No. 15 on postcard, p. 145

Magnet Controllers

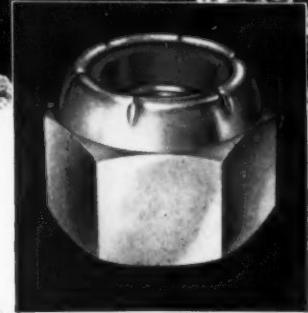
Heavy-duty magnet controllers are covered in a new bulletin. It describes magnet controllers for operating 45 to 80-in. lifting magnets. The publication gives typical applications for the units, schematic wiring diagrams, and over-all dimensions of push button and lever type masters. (The Ohio Electric Mfg. Co.).

For free copy circle No. 16 on postcard, p. 145

Power Press Brakes

Improvements in a manufacturer's power press brakes are announced in a data sheet. It tells of a design change which provides an easier method of releasing the "wedge release" in the event of stuck dies. In addition, this improvement eliminates improper adjustment of the wedge by operators or maintenance men. (The Lodge & Shipley Co.).

For free copy circle No. 17 on postcard, p. 145



On Link-Belt's new one yard shovel...

ELASTIC STOP® nuts remain tight under terrific shock loads



Elastic Stop nuts secure clutch drums to gears.



ELASTIC STOP NUT CORPORATION OF AMERICA

2330 Vauxhall Road, Union, N. J.

The engineering concept behind Link-Belt's new LS-98 Shovel-Crane provides a highly portable machine with big shovel characteristics plus stepped-up work cycles that produce substantial increases in capacity. To do this, the shovel-crane had to be built to stand up under heavy vibration and extreme shock loads. That's why Elastic Stop nuts were chosen for the critical fastening jobs throughout (i.e., hook rollers to brackets, clutch drums to gears, counterweight to upper frame, drum laggings to brake drums, engine mountings, side housing to revolving frame, etc.).

The locking principle of Elastic Stop nuts has been tested and proved by over 25 years of actual field service on equipment like this in every conceivable product of industry from locomotives to roller skates. What's special about this nut? For one thing, you can "stop" it at any position on the threaded length of the bolt . . . or wrench it tight against the work. No matter where you leave it on the bolt, it will remain tight in that exact position, even though you subject it to heavy vibration and shock loads. Reusable many times.

Elastic Stop nuts are available from a watchmaker's 0-80 all the way to 4"-in stainless steel, brass, aluminum and other alloys. Protect *your* product with "fastener insurance." We'll supply free test samples.

**Elastic Stop Nut Corporation of America
Dept. N7-377, 2330 Vauxhall Road, Union, N. J.**

Please send me the following free fastener information:

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nut bulletin

Here is a drawing of our product.
What self-locking fastener would
you suggest?

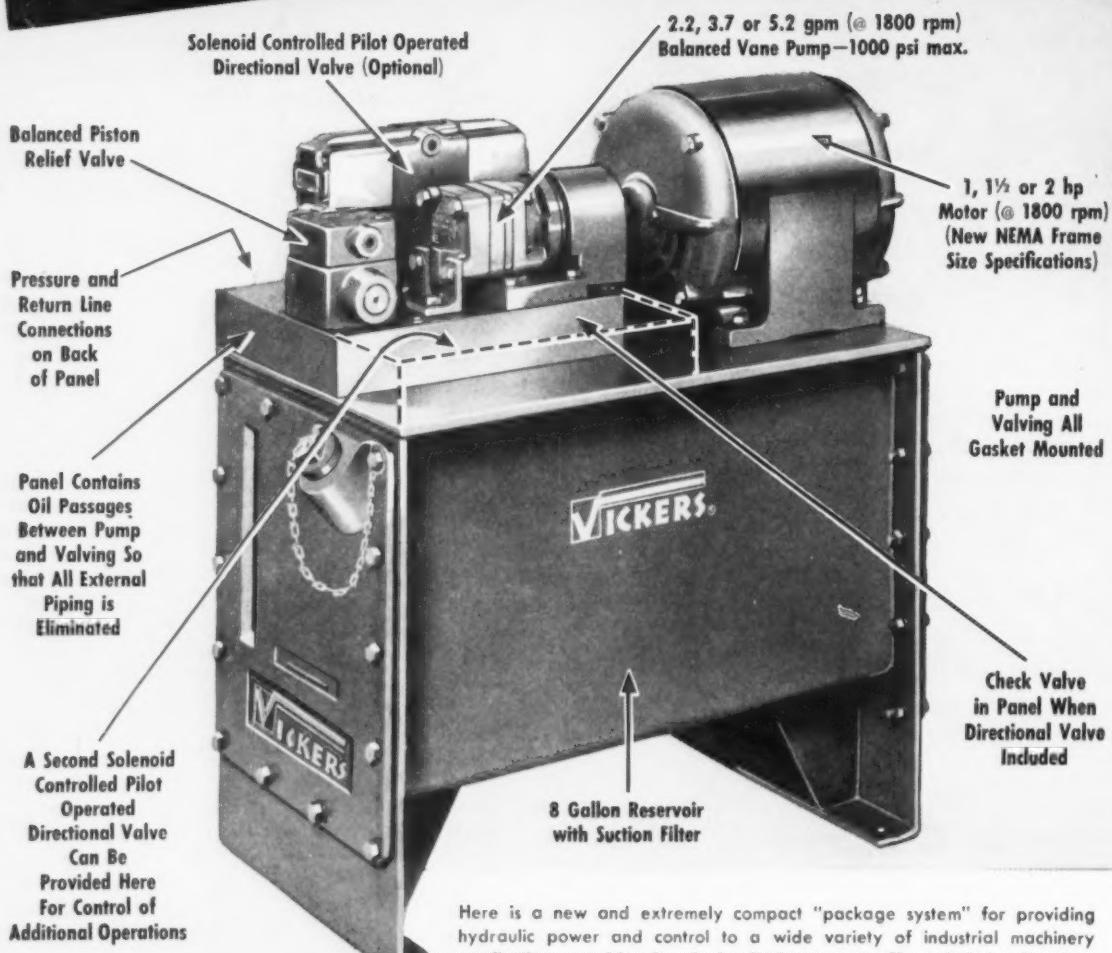
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A NEW IDEA...in hydraulic power and control systems



Here is a new and extremely compact "package system" for providing hydraulic power and control to a wide variety of industrial machinery applications requiring low hydraulic horsepower. These include clamping, gaging, transferring, rollover, elevating, indexing, chuck and clutch operations, etc.

Note the many features indicated on the photograph above. The result is improved and simplified hydraulic design . . . also reduced installation and maintenance costs. This "package system" has great flexibility . . . is available in a wide variety of combinations of standard components assembled to suit individual requirements. Pretested and ready for immediate operation, it has also the advantage of undivided Vickers responsibility. For further information, ask for installation drawings 178706-8.

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These publications describe money-saving equipment
and services . . . they are free with no obligation . . . just
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This section starts on p. 140

Brick, Ramming Mixes

Effective methods of installing basic brick and ramming mixes in electric steel-making furnaces is illustrated in a 48-page manual. It covers installation procedures for all types and sizes of electric furnaces. It also contains a special section on furnace lining repairs and suggests methods for rebuilding and heating up furnaces. (Kaiser Aluminum & Chemical Sales, Inc.).

For free copy circle No. 18 on postcard

Heat Resistant Alloys

A large distributor of heat and corrosion resistant alloys has just completed and released their new catalog and stock list. It outlines their facilities and departmental services. (Rolled Alloys, Inc.).

For free copy circle No. 19 on postcard

Continuous Furnaces

Continuous heat treating furnaces are covered in a 4-page bulletin. It contains specifications, process recommendation and application examples for snap hearth, cast alloy link belt and brazing furnaces. (Surface Combustion Corp.).

For free copy circle No. 20 on postcard

Nylon Powders

Finely divided nylon powders are covered in technical publications. They tell how this material is "a source of even better performance for thousands of products." (National Polymer Products, Inc.).

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Rolling Mills

Rolling mills are pictured and described in a 24-page booklet. It shows: two-high pinion drive mills, four-high pinion drive mills, two-high square gear mills, four-high square gear mills, tandem mills and accessories. (Fenn Mfg. Co.).

For free copy circle No. 22 on postcard

Turret Tool Posts

An 8-page catalog describes a turret tool post with a clamping type handle. It assures positive locking and withstands vibration even when handling interrupted cuts, or the fast feeds and speeds of heavy-duty production lathes. (McCrosky Tool Corp.).

For free copy circle No. 23 on postcard

Coil Cars

Heavy-duty coil cars are shown in a 6-page foldout brochure. These coil cars, it says, are fast and safe for loading and unloading of reels. They require no pits. (The Herr Equipment Corp.).

For free copy circle No. 24 on postcard

Power Sweeper

Power sweepers with automotive styling are presented in new literature. Their power economy allows a full 8-hour day of sweeping on one tank of gas. Powered by a 15-hp engine, they have a 3-speed transmission. The sweepers sweep 126,000 sq ft per hour at 6 mph. (Wilshire Power Sweeper Co.).

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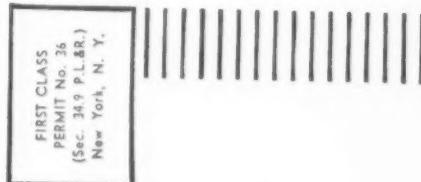
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FREE TECHNICAL LITERATURE

Products, Processes

"Products and Processes" contains more than 30 color and black and white photographs giving a pictorial review of one firm's mining, smelting, refining and research operations. (American Smelting and Refining Co.).

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Brazing Stainless

Experimental and production brazing and processing of stainless steel is covered in a new catalog. It describes and illustrates the special facilities and skills available to the user of parts fabricated of stainless steel, titanium and special alloys. Included are specific discussions of techniques and equipment employed for brazing and processing stainless steel, titanium and aluminum. (Wall Colmonoy Corp.).

For free copy circle No. 31 on postcard

Pressure Tape

Uses and applications for printed and die-cut pressure-sensitive tapes are listed in a 3-page foldout. It illustrates in color how printed tapes identify standardized stock items, and to bundle and identify pipe and barstock in one operation. (Minnesota Mining and Mfg. Co.).

For free copy circle No. 27 on postcard

Punch Presses

Heavy-duty turret punch presses with a direct measuring gage and table are shown in a brochure. It includes specifications and information on features and operating principles of these 40- to 150-ton capacity machines. Equipped with a direct measuring gage and table, these presses provide a flexible locating method. (Wiedemann Machine Co.).

For free copy circle No. 32 on postcard

Optical Instruments

Ways to use optical instruments to simplify and speed manufacturing and inspection operations are outlined in a new booklet. It contains up-to-date information on precision optical instruments and suggests ways to use them to gain faster, easier, lower-cost production. (Bausch & Lomb Optical Co.).

For free copy circle No. 28 on postcard

Magnesium, Titanium

Magnesium and titanium data is contained in a new 44-page booklet. It covers physical and mechanical properties, mechanical properties at elevated temperatures, metal weights, forming characteristics, specification tables, corrosion behavior, surface treatments, welding and joining, machining, heat treatment and stress relief, and other similar design data. (Brooks & Perkins, Inc.).

For free copy circle No. 33 on postcard

Centerless Lapper

Containing 12-pages, a catalog covers a centerless lapping machine. These centerless lapping machines take high quality thrufeed centerless ground work and improve the sizing and finish. (The Cincinnati Milling Machine Co.).

For free copy circle No. 29 on postcard

Cold Rolling

Cold-rolled spring steels are the subjects of a new fact book. The 48-page brochure is more than a catalog of sizes, grades, and hardnesses of steel. It is a brief course of instruction on the whole subject of spring steel. (Wallace Barnes Steel Div., Associated Spring Corp.).

For free copy circle No. 30 on postcard

Fast Lead Sockets

Fast lead and surface drive sockets are listed in an 8-page catalog. These fast lead sockets are a new development designed for high-speed nut running, particularly on applications involving multiple-unit tools. (For free copy, write on company letterhead to The Apex Machine & Tool Co., 1029 So. Patterson Blvd., Dayton 2, Ohio.).



Postcard valid 8 weeks only. After that use 3/7/57 own letterhead fully describing item wanted.

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EXTRA

Progressive News



VOL. 5 NO. 160

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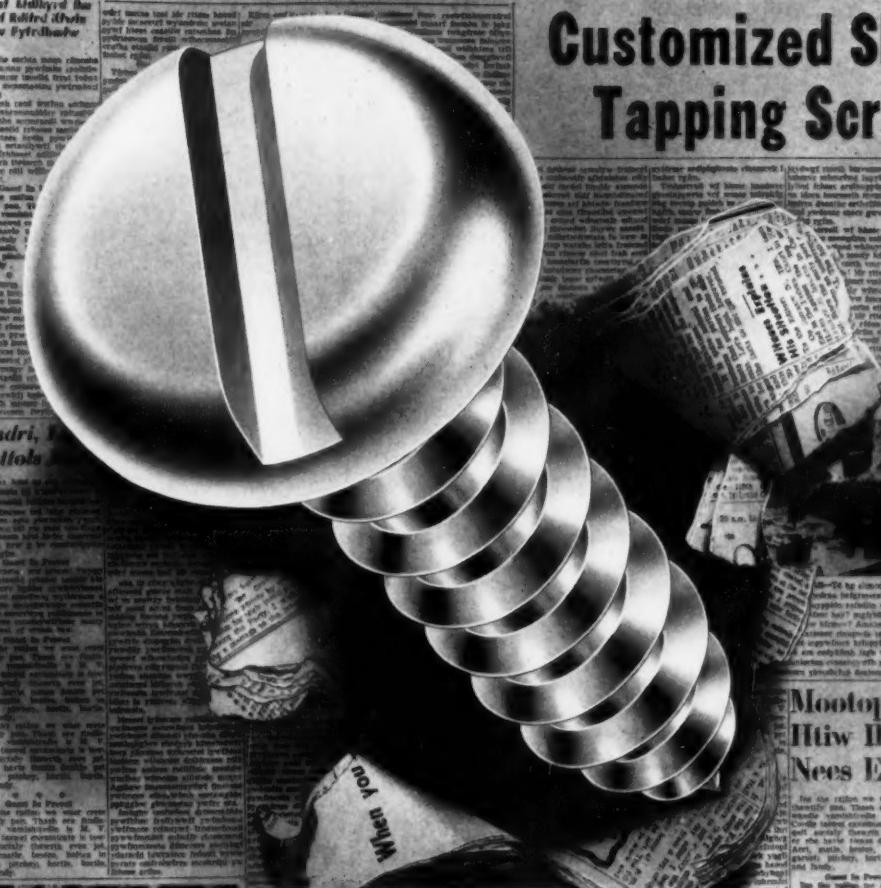
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Now you can get from PROGRESSIVE Slotted Tapping Screws with an extra customized touch — Slotted Tapping Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; plus (3) the double economy of low initial cost and the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

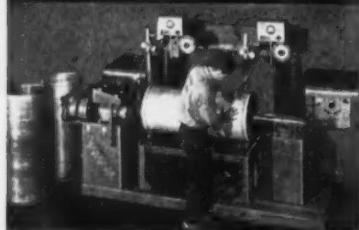
STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

THE PROGRESSIVE MFG. CO.

Division of The Torrington Company
78 Norwood Street, Torrington, Connecticut

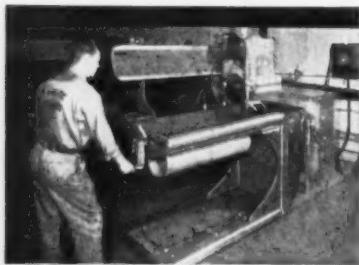
Cast Twisted Piping Without Inserts

how to make
fusion butt
welding a
push-button
operation



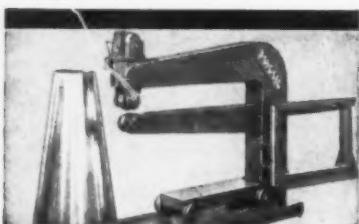
CIRCUMFERENTIAL

automatic welding fixture
Designed for circular welding of components with automatic chucking and ejection of parts and transfer. Chuck expands internally for sizing. Surface speed to 300' per min.



LONGITUDINAL automatic
fusion butt welding fixture

Hold-down fingers with "toe touch" control lock parts in position for welding. Back-up mandrel with up to 6 copper inserts permits fast job changes. Handles all weldable metals .005 to 1" thick and lengths from 2' to 12'.



ROLL PLANISHING FIXTURE

Cold-rolls and smoothen fusion welds (circ. & longit.) under controlled pressure up to 10 tons. Handles 1 1/4" to 10" dia. and lengths to 16'.

Write today for further information
785 No. Prairie Ave., Hawthorne 2, Calif.



Where passageways in castings are twisted, usually you pour around permanent tube-inserts.

Now try this: Cast around sheathed-tube cores. Remove them later, and unlined tubes result.

■ Narrow, twisted passageways in castings often spell trouble for the founder. Now you can cast even highly complex ducts without wall lining. This at least for parts cast in aluminum and magnesium alloys.

A sheathed-core development enables this. No permanent tube-insert is used.

The sheathed-tube method of coring will be discussed in Cincinnati on May 8 at the Castings Congress of the American Foundrymen's Society. R. F. Dalton, research and development director of Howard Foundry Co., Chicago, will deliver the talk.

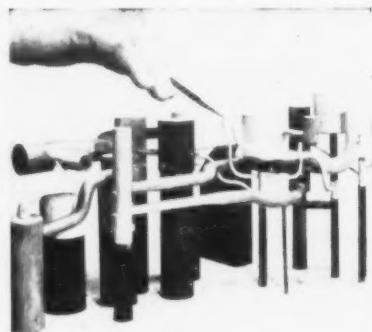
The coring method uses a pre-formed metal tube sheathed in a flexible refractory sleeve. Both tube and sleeve are removed after molding the casting.

A chemical agent dissolves the tube. The sleeve is removed by hand, and serves as visual evidence of a clean passageway. Aluminum and magnesium alloys are not affected by the chemical.

Sand Cores Too—The sheathed-tube core is used only when you can't mold a passageway with a sand core, or when sand coring costs are higher. The smallest practical sand core diameter is about 1/4 in. Anything less results in a fragile core.

With sheathed-tube cores you can cast 1/8-in. diam passageways. Cores 1/8 in. diam can be cast up to 16 in. long. The high rigidity and dimensional stability of the core make this possible.

Larger diameters can be cast with the sheathed-tube cores in much longer lengths. They can twist in many directions. If desired, they can assume shapes following casting contours. Howard Foundry is now casting a 5/16-in. diam sheathed-tube core four ft long.



This core mock-up shows the passageways' complexity.

Passageways for transmitting oil, fuel, coolant, and hydraulic fluids may be internally "wrapped" around a large cylinder in one continuous line with the new core. So fluid lines need not be attached to exteriors of cast components.

Want More Data?

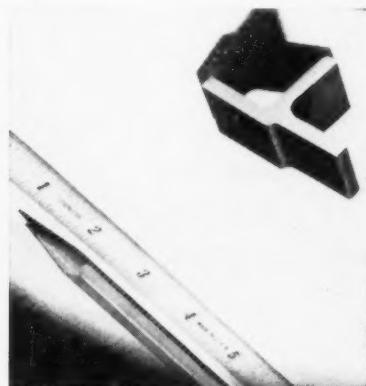
You may secure additional information on any item briefed in this section by using the reply card on page 145. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Press Extrudes Small Carbon Steel Part

Small extrusions squeezed out of a press save an airplane maker 75-pct in machining time. The item is an airframe section made of SAE 8630 carbon steel. Previously the section was made of bar stock; much of the material consequently was machined away.

Extrusion Is Difficult — The piece's small size and the material's properties make it hard to extrude. The press squeezes a 25 sq in. billet into a 0.4-sq in. T-section. Production speeds run up to 45-mph. as shapes leave the press.

The unit extrudes the billet at temperatures of about 2250°F to



An extrusion press produces this small aircraft part.

a thickness of 0.140 in. at a pressure of 150,000 psi. The extruded piece comes in bars 25-ft long. Then machines cut it to size.

The steel extrusion is turned out at the Watervliet, N. Y. plant of Allegheny Ludlum Steel Corp.

X-ray Analyzer Reduces Long Job To Minutes

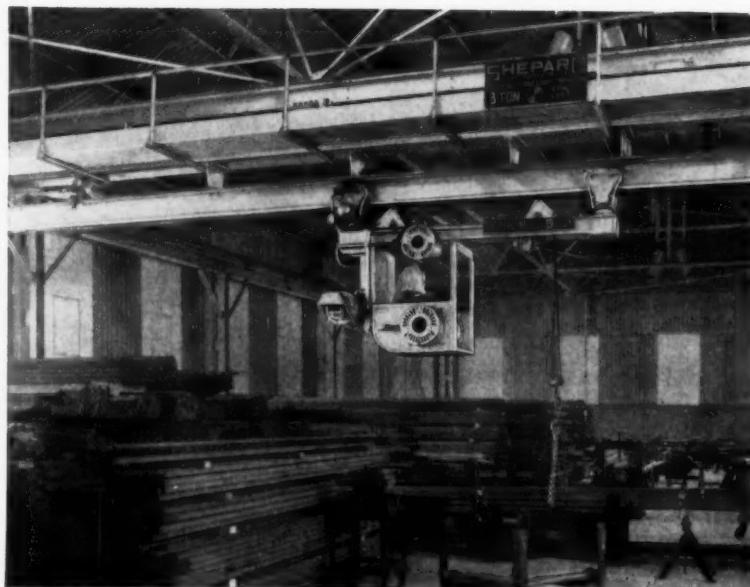
If you're among those who have fumed at long delays in analyzing metals, then maybe this instrument is for you. With standard wet chemical methods, running a metal analysis may take hours, even days. An x-ray emission spectrometer can often do the same job in minutes.

SHEPARD NILES

Monorail Hoist

TRANSPORT MATERIALS

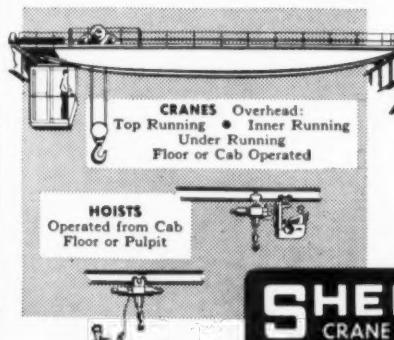
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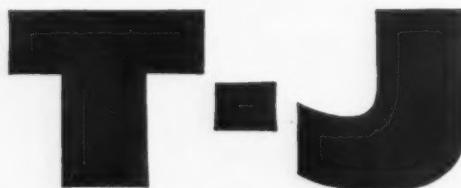
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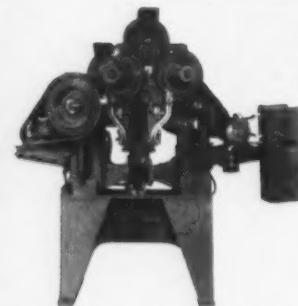
Speeds up riveting and clinching!

It's a quick step to faster assembly and reduced labor costs when you put T-J Rivitors and Clinchors in your production picture! These performance-proved machines are suited to a wide range of assembly jobs for aircraft, automotive, farm machinery, riviting jobs of all kinds.

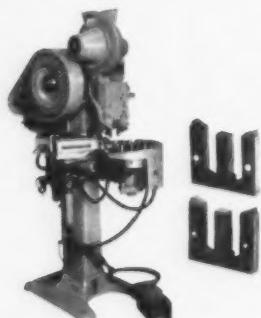
T-J RIVITORS automatically feed and set solid rivets with high production. Electrically powered Rivitor sets solid steel rivets up to $\frac{1}{8}$ " long. Throat depths 8" to 36".

T-J CLINCHORS set clinch nuts with fully automatic operation, controlled by a single foot pedal. Available in Underfeed and Gravity feed models, throat depths 8" to 36".

Send today for these helpful references: Rivitor bulletins 646 and 555 . . . Clinchor bulletin 555. The Tomkins-Johnson Co., Jackson, Mich.



RIVETS 4 AT A TIME! Special quadruple riveting unit, incorporating two Model "RR" Twin Rivitors, mounted on a special welded steel base. Equipped with air-operated hold down mechanism and a safety air trip arrangement. Toolled for riveting left hand and right hand automotive muffler bracket assemblies.



SPECIAL TWIN RIVITOR! Toolled for 6 station indexing fixture, incorporating automatic clamping and ejecting mechanisms, for riveting laminated armature assemblies.



T-J CLINCHOR adaptable to a wide range of clinch nut setting problems. Gravity feed model shown here.

TECHNICAL BRIEFS

The electronic device does this by "exploring the inner space" of the molecule itself. Auxiliary units then graph what atoms lie within the sample and how many there are.

"Pushbutton" Analysis — The x-ray emission spectrometer, it's claimed, turns laboratory analysis of unknown metals and alloys into a semi-automatic "pushbutton" process. The X-ray Department of General Electric Co., Milwaukee, says the equipment puts laboratory analysis almost on a "hold the phone" basis.

It analyzes elements in specimens down to Atomic Number 13 (aluminum). In doing so, the spectrometer does not destroy or alter the sample.

Unit "Cast-Assemblies" Small Jack Knife In Single Operation

Newest item to be produced in a single diecasting cycle is a miniature jack-knife. The perfectly detailed knife is only 1 $\frac{1}{4}$ in. from the blade's tip to the handle's end. When closed it is $\frac{3}{4}$ -in. long.

Producer of the knife is Gries Reproducer Corp., New Rochelle, N. Y. The company uses fully automatic machinery to "cast-assemble" the item, trim off gates and sprues, and eject a ready-toship unit. The operator needs only maintain a proper supply of zinc in the melting pot.

Unit Casts Pivot In — The one-operation job uses a single die. The pivot is cast in, but the blade opens and closes easily. The knife is ready for use just as it comes off the machine; it really works. However, it generally gets a brass-plating or bright-burnishing to improve appearance.

Other miniatures are also cast in the same way. These include a pair of scissors and a pair of pliers, both less than 1 $\frac{1}{4}$ -in. long.

In addition to novelties, the process finds other uses. Some products currently in production are: swivel rings, binder rings, and sister hooks. The same advantages (low weight and cost, few parts, no



Ordinary pencil tip illustrates jack-knife's size.

assembly) might also be extended to such parts as self-aligning bearings, broom handle caps, hinges, hasps, bolts, etc.

The company cast over a billion parts last year by this process.

Stress Analysis Test Eliminates Plastic Model of Structures

A new stress analysis technique eliminates plastic test models.

The process uses conventional photoelastic methods for experimental stress analysis of actual full size structures or components made of metals and other materials, regardless of size or shape.

The difference between the new method and conventional techniques is that this transparent plastic is bonded to the actual part. Researchers figure strains under actual test conditions.

Determines Strength—It can be used both statically and dynamically in determining strength of structures in service. The setup combines



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both optical and electronic methods. It instantly locates and accurately evaluates regions of maximum strain.

PhotoStress, as its developers call it, works at temperatures ranging from minus 67 to 284°F. It operates when immersed in liquids such as water, salt water, oil and gasoline.

How It Works — Basically, the process functions like this: a part to be stress analyzed gets a thin layer of a special transparent photoelastic plastic. When, testers apply a load, strains transmit to the plastic coating. This coat becomes doubly refractive. The change is directly proportional to the intensity of stress.

The process uses both liquid and strips of photoelastic material. These differ considerably in their characteristics and use. The flat strips fit any sample contour; the liquid plastic provides stress analysis of very small parts and complex shapes.

In Full Color—Under any type of loading, the plastic coat affords a complete color picture of the strain distribution of its entire surface. It also highlights areas of stress concentrations.

The process, now available through Tatnall Measuring Systems Co., Phoenixville, Pa., brings results in a plant or laboratory and can even be used in the field. The Tatnall firm is a recently acquired subsidiary of The Budd Co., Philadelphia.

Closed-circuit TV Unit Reduces Test Time

Closed-circuit television cameras about twice the size of a cigar box are helping to relieve the shortage of skilled technicians. They also reduce development time of jet engine control systems at General Electric Co.'s flight propulsion lab.

A TV camera, strategically

placed in a controls laboratory, picks up hydraulic-control test data emanating from a computer. It immediately pipes this via coaxial cable to an equipment testing engineer some 200-ft away in another laboratory. The information appears on a monitor similar in appearance to a home receiver.

Firm Abandons Phones—The method eliminates two-way phone communications formerly used. Thus, the engineers previously required to test data via phone to the test engineer are now freed for other work.

In addition, use of the closed-circuit TV system reduces testing time by as much as 50-pct.

Actual operating control standards are calculated on an analog computer. This simulates operation of the aircraft engine. The data are then relayed to the test lab. Here, calibration characteristics of the controls-system are correlated simultaneously with all other properties as indicated by the computer.

Video Eye Watches—The sensitive eye of the TV camera picks up data emanating from the computer onto a graphical data sheet. The information, in turn, instantly transmits to the test side. A test engineer views it on a 12-in. monitor.

Materials Handlers Develop Ingenious Lift Truck Devices

To speed materials handling and cut its costs, plant owners have developed many ingenious devices. Such simple, home-made gadgets can extend the trucks use, cut maintenance and save time and space, points out Lamson Mobilift Corp., Syracuse, N. Y.

Hawley-Gilbert Co., Portland, Ore., uses chisel-forked lift trucks to handle 1680 lb loads of roofing material. Old engine oil lubricates the forks. The slicked forks move

The advertisement features a large, cylindrical metal ladle being heated from below by a burner. A worker is visible on top of the ladle, monitoring the process. The text is arranged in a grid-like graphic:

NOW...	SPEED
CASTING	OPERATIONS
WITH THIS	THERMAL
LADLE HEATING BURNER	

MANY COST-SAVING APPLICATIONS
The extreme high heat release rate of the THERMAL burner makes possible the application of this ladle heating installation without altering your existing facilities or production methods.

1. Reduces ladle pre-heating time as much as 75%.

2. Maintains pouring temperatures during continuous casting operations.

3. Can pre-heat or even melt down a charge within the ladle.

4. Atmosphere can be controlled as needed.

5. High velocity can actually stir the molten metal.

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THERMAL ladle heating installations are available complete with ladle covers or ready for mounting to your present cover. All necessary valves, blower, pump, etc., are supplied for immediate application.

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Thermal Research & Engineering Corp.
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TECHNICAL BRIEFS



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Perhaps an Acme weldment can improve your product. Why not call on Acme today.

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Send us your blueprints for a prompt quotation and ask for our informative folder, ACME PLANNED WELDMENT FABRICATION.

Acme WELDING

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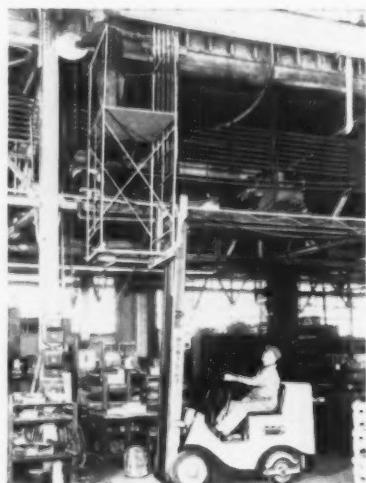
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STEEL • STAINLESS STEEL • EVERDUR • ALLOYS • CUSTOM FABRICATORS of PRESSURE VESSELS • MACHINERY BASES and COMPONENTS • WELDED ASSEMBLIES • STEEL TANKS

smoothly under the shingles and move them to pallets without shingle damage.

Light Worker — Lamson Corp., Syracuse, N. Y., of the conveyor and airtube maker, cut costs by attaching a standard scaffold to truck forks. Four U-bolts secure the scaffold to angle irons clamped on the forks. Lamson uses this rig during its off-shift to service ceiling lights, for piping and other overhead work. The industrial truck—scaffold setup reaches the plant ceiling faster, and at lower cost than other methods. Temporary scaffolding isn't needed, nor is special equipment for this routine job.

Detroit Mold Engineering Co., Chicago, uses a simple boom and tong attachment instead of forks for loading heavy dies. This simple attachment eliminates the block and



Maintenance men use this innovation for lightbulb servicing.

tackle used before to handle heavy molds. No pallet is needed. The job is done quickly.

Moves Paper Bales — Another Chicago firm, Aetna Waste Paper Co., simplified handling waste paper bales by welding two spikes to a fork carriage. The simple device enables handling baled waste paper and corrugated board

from any axis. The spike-equipped truck easily loads freight cars to maximum weights, and thus saves the company thousands of dollars every year.

Refrigerators are stacked three high by warehouseman Paul-Jeffrey Co., Inc., Syracuse, N. Y. A simple



One user prefers a boom and tong setup instead of forks.

rack attachment eases the job.

The lower lip of the rack stacks the appliances two-high, while the upper lip tiers three-high. Pallets are avoided, and the attachment prevents damage by forks piercing the boxes. A narrower aisle is possible, since no space is needed to maneuver the forks. The forks are reattached for conventional use.

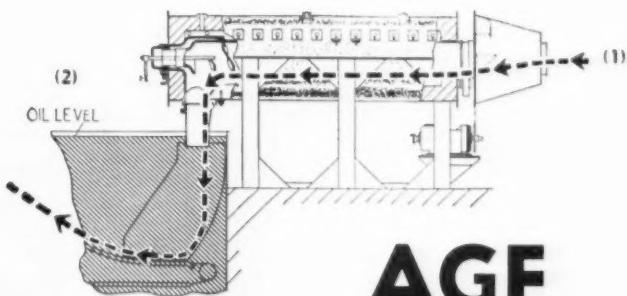
Chart Aids Engineers

Engineers use some factors daily; yet, these still slip their minds. Again and again they refer back to textbooks for conversions of inches to centimeters, watts to horsepower, etc. In the best interest of busy, overburdened or forgetful technicians, a firm has come up with a handy "conversion factor" chart.

It lists such items as: cubic feet to liters, microns to meters and quintal to pounds. Those who want such a chart can obtain it from Precision Equipment Co., 3716 N. Milwaukee Avenue, Chicago 41, Illinois.

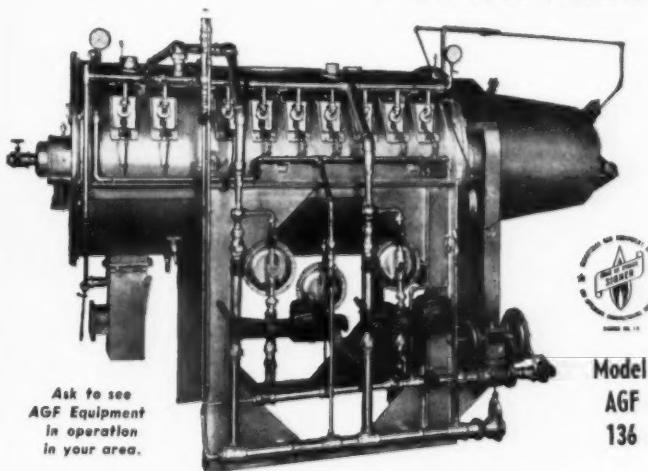
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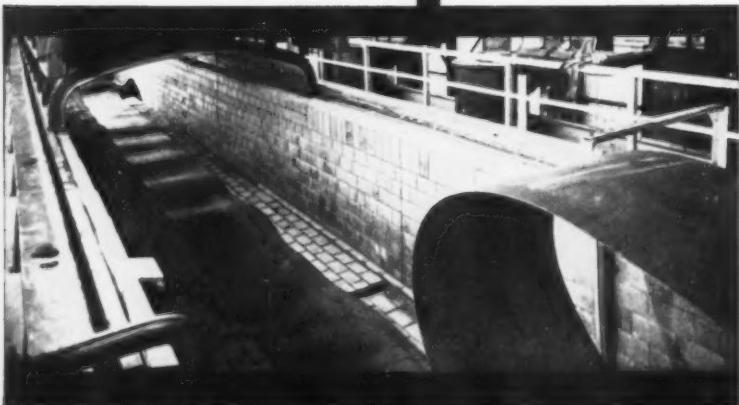
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- COATINGS
- LININGS
- RIGID PLASTICS



Write for Bulletin CC-3 giving informative data on the complete Atlas line.

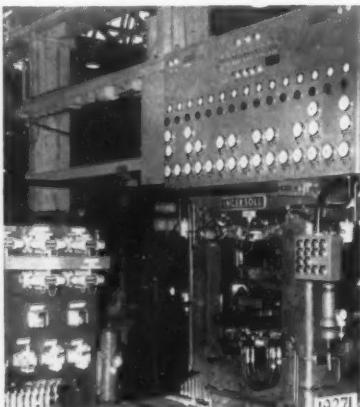
Automatic Gage Setup Checks Dimensions, Assembly Operations

Here's an automatic gaging set-up that does more than simply inspect parts for proper dimensions. It also checks to make sure an automatic assembly operation was done right. And all this at once.

In production use now by one auto maker, the gaging station accepts or rejects engine blocks. It marks acceptable blocks to show their relative size. Rejects are shunted out of the line. They do not go on to the next operation.

Automatically Inspects — The gager automatically inspects five camshaft bores and five crankshaft bores in each engine block. Two diameters are measured in each crankshaft and each camshaft bore. The total of 20 diameters are all checked at the same time.

In addition, bearing liner alignment is inspected. This is where the check of an automatic assembly operation comes in. Bearing



This combination gage-transfer unit handles 95 blocks an hour.

liners are automatically assembled in their camshaft bores. Oil holes in both liners and camshaft bores must align within close limits. The automatic equipment does this. And the gager doublechecks to see that it's done correctly.

Gaging elements and classifying equipment is supplied by Federal Products Corp., Providence. Handling, positioning and machine controls come from The Ingersoll Milling Machine Co., Rockford, Ill.

Air Plugs Do Measuring—Measuring is done with 10 air plugs automatically inserted into the bores. Both ends of each bore are checked.

Signal lights show engine block condition. A green light means all 20 diameters and oil hole alignment are within tolerances. A stamper then marks the block on each end. This last shows assemblers whether the No. 1 and No. 5 crankshaft bores are on the high or low side of nominal size. If any one dimension is oversized, the block is rejected.

The automatic gage and transfer machine does all this at 95 en-

gine blocks an hour. Parts move along the line at normal production speed.

Metalworking Shop Ups Broach Guide Life By Improving Methods

When a metalworking shop knows exactly what is taking place, both in fabrication processes and assembly, proper steps can be taken to improve methods, reduce waste and, in the long run, avoid customer dissatisfaction. Tool engineering at the Pennsylvania Lawn Mower Div. plant of American Chain & Cable Co., Exeter, Pa., doubled the life of broach guides at little additional cost.

The family lawn mower cuts year after year with only an oc-

casional oiling and an annual blade sharpening. For the ever-handy and traditional reel type power mower and its useful counterpart, the hand mower, modernization has brought little change in basic designs. However, the desire on the part of the builders to make a better mower has resulted in certain improvements that yield greater service life.

Key Improvement—One of the keys to improving the mower was in the design of the reel shaft ratchets. These permit the mower to be backed without turning the reel blade. At the same time, the ratchet functions as a differential when cutting a curved border of grass.

The ratchet dogs travel radially in slots which are broached on either end of the reel shaft. Accurate size and positioning of the



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BUCKET STAMINA
LOAD CAPACITY
DIGGING POWER*

Foundries, steel mills, power plants—all acclaim this Hayward Electric Clam-Shell as the finest hook-on bucket obtainable. Handles extra large loads safely. Notable for giving many years' service with minimum maintenance. Interchangeable with your electric magnet. The Hayward Company, 50 Church St., New York 7, N. Y.

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Many **GOOD** products
can be made **BETTER**
...with



**SPECIAL
FASTENERS**

slots and their smooth finish are critical to proper functioning, endurance and efficiency of the ratchet.

Broaching of these parts is performed in a standard type V-1-2 unit, designed by the American Broach and Machine Div., Sundstrand Machine Tool Co., Rockford, Ill. The tool guide has a V-block in the base; the broach is guided in a vertical slot through the shaft holes.

Guide Reverses—This guide is machined with slots on both sides, making it reversible. Thus, when the first slot has become worn out, the guide portion is reversed. This innovation thereby delivers double the number of broaching cuts and adds very little to the initial cost of the broacher.

The two 0.252 in. holes in the ends of the shaft are drilled simultaneously, using a double-spindle drill press. A V-block drilling jig assures correct positioning of holes and centerline parallelism.

Barrel Finishing and Tumbling Industry Gets More Scientific

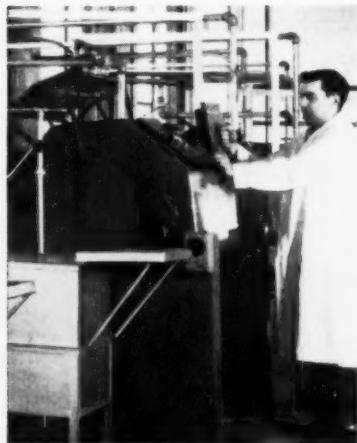
Oldtime armorers used to knock off the rough spots from armor by putting each piece in a barrel with assorted stones and directing a handy serf to roll the barrel around the courtyard until ordered to stop. Today barrel finishing is on a more scientific basis.

What is believed to be one of the world's largest research and experimental centers for barrel finishing of metals was recently opened by Lord Chemical Corp., York, Pa.

Modern Tumbling—The new 40 x 120 ft plant addition contains an experimental tumbling room 40 ft wide by 73 ft long. It includes a chemical laboratory 19 x 21 ft. The experimental shop embodies many

modern concepts in this method of precision finishing. Arranged in rows along the two long sides of the room are 30 barrel-finishing machines, representing every available type. horizontal octagonal, horizontal hexagonal, triple-action, tilttable, submerged, wire-mesh, wooden tumbling and wooden finishing barrels are all included.

In designing this large experimental tumbling shop, the aim was to provide an ideal set-up. Hence nothing that can make the job easier or more efficient has been overlooked. A 1½-in. pipeline,



Researcher tends one of the 30 barrel finishing machines.

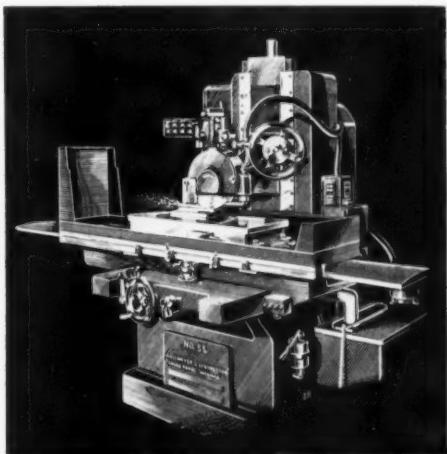
conveniently located above each row of barrels, feeds water to the barrels through individual 1-in. lines. Quick acting valves and swivel spouts provide the amount of water needed at each barrel in the quickest possible time.

Self-Cleaning Floor—The concrete floor is rendered self-cleaning and self-drying by drainage channels 15 in. wide covered by metal gratings. There are two such channels, each running nearly the full length of the room, in addition to 8-in. rear drainage channels. The double-pitched floor (pitch is ¼ in. per foot) slopes gently toward each channel so that water is unable to remain on the floor.

This modern shop tumbles work-pieces from the smallest instrument pinion, weighing but a fraction of a gram, to large parts weighing 100 lb or more. Jobs that can be done here include: metal cleaning and degreasing, descaling, deburring, abrasive and non-abrasive cut-down, stock removal, fine finishing, formation of radii, coloring, burnishing, polishing, rust-inhibiting

and mechanized drying. All ferrous metals, hard steels, titanium, aluminum, brass and copper alloys, magnesium and zinc die-cast materials are handled with ease.

Barrels start with a tiny octagonal barrel having a 3-in. drum 6 in. long (capacity 44.7 cu in.) and go all the way up to a huge two-compartment barrel with a 36-in. drum 60 in. long.



Questions you should ask before you buy a

SURFACE GRINDER

- Are column and base *one piece* for permanent, vibrationless rigidity?
- Are both longitudinal travel base and cross feed hydraulically actuated?
- Is wheel head powered for rapid vertical travel?
- Is it equipped with Vickers vane hydraulic pump?
- Is longitudinal table capable of speeds to 125 fpm?
- Is it equipped with greased-for-life, pre-loaded ball bearing spindle?
- Does wheel head have 18 inch vertical movement?
- Is the spindle capable of speeds of 1925 and 2500 rpm?
- Does it have a 12" x 36" table working surface?
- Is it equipped with Bijur one-shot lubricating system?

You'll Choose Grand Rapids Grinder, No. 55 because it's the only grinder of its type that answers an emphatic "yes" to every one of these ten important questions.

*Write for 24 page book
that tells all about it.*



GALLMEYER & LIVINGSTON COMPANY
400 Straight Ave., S.W., Grand Rapids, Michigan





Red Circle Rolls for all Purposes

The Red Circle on the Roll is the Hyde Park mark of Quality. Hyde Park makes rolls for every type mill.

Chilled Rolls

Alloy Iron Rolls

Moly Rolls

Nickel Chilled Rolls

Grain Rolls

Cold Rolls

Sand Rolls

for

Finer Finish, Longer Life
and Greater Tonnage
specify Red Circle

Hyde Park

FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland County, Pa.
ROLLS • ROLLING MILL MACHINERY
GREY IRON CASTINGS



Dispersions Protect Special Alloys

Glass dispersions provide a dry continuous film for protection and lubrication of work.

The material inhibits oxidation and surface contamination during the heating cycle.

- A new concept in metalworking lubrication is now made possible with two new dispersions of glass in isopropyl alcohol. In a recent test on superalloys, the materials' use more than doubled the life of a die.

These dispersions apply to the work at room temperature, forming a dry continuous film. This inhibits oxidation and surface contamination during the heating cycle. At a temperature below that at which the work is forged, the glass fuses to the surface, providing a true hydrodynamic film during the forming operation.

Protects Forgings — Developed by Acheson Colloids Co., Port Huron, Mich., the glass dispersions provide a protective and lubricating coating for the forging of special alloy steels, titanium and other metals which are particularly subject to oxidation or gas absorption at elevated temperatures during pre-heating and forming.

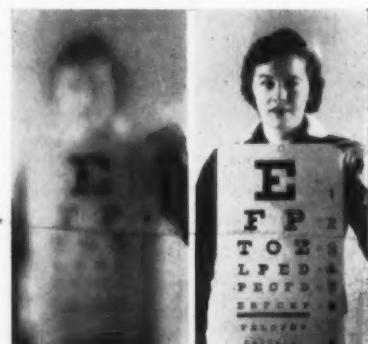
To prevent the molten glass from adhering to the die during the form-

Want More Data?
You may secure additional information on any item briefed in this section by using the reply card on page 145. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

ing operation, dies can be pretreated with dispersion of colloidal graphite in water in accordance with Acheson's standard recommendations for tool pre-treatment.

Polyethylene Resins Extrude Into Very Clear Films

Two new film-grade polyethylene resins offer greatly improved clarity. One of the resins is a completely new formulation which is still undergoing field evaluation. Pre-



Older film (left) is less clear than new material (right).

liminary tests indicate that it extrudes into extremely clear film.

The other resin is a modification of an existing film-grade resin for which extensive operational data is already available.

Dramatic Demonstration—As a demonstration of the relative clarity of film-grade resins, a standard eye-chart test was used. A chart was photographed at exactly the same distance behind three types of film. All but the large "E" appeared as

a meaningless blur behind film made from an older-type resin.

Through film made from the new intermediate resin, letters were legible though slightly fuzzy. All letters, however, can be read distinctly through film made from the new formulation resin.

The two additions to the series of polyethylene resins are developments of the Bakelite Co., New York City. The polyethylene films resist moisture, tearing, abrasion and cold temperatures.

Compound Cleans Metal

Non-foaming, a new cleaner removes identification inks, grease, oils, and other heavy soils from aluminum.

Announced by Oakite Products, Inc., New York City, the compound cleans without foaming in agitated tanks. Even without agitation its ability to remove difficult soils is said to be excellent. Used at 6 to 8 oz per gal of water, at temperatures between 160° and 180°F., solutions are safe on aluminum and its alloys.

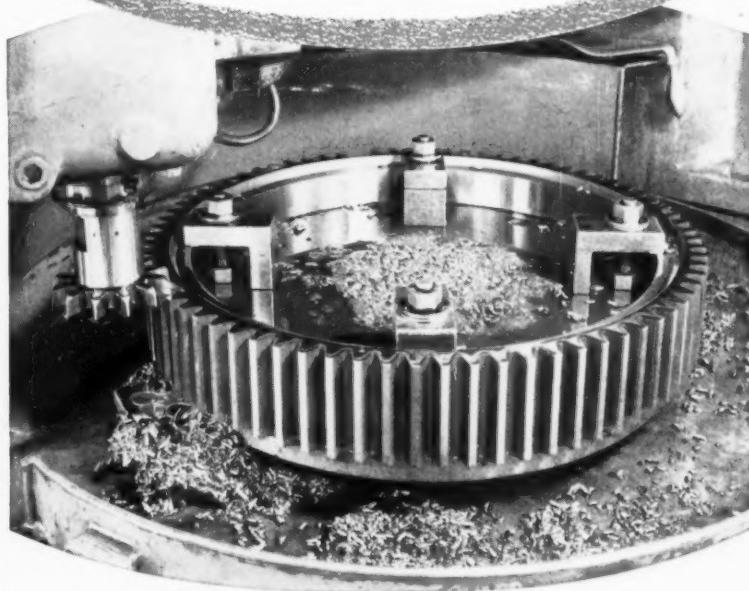
Air Force Studies Paint, Lacquer

Paint and lacquer remover formulations containing solvents other than the strategic methylene chloride are evaluated in an Air Force study.

Materials were investigated for use as surface active agents, activating agents, thickeners, and evaporation retardants. The formulations included commonly available ingredients. Many of these were evaluated for the removal of paint and lacquer coatings from metal.

What It Showed—The best experimental formulation developed was nitromethane-toluene-ethanol solvent mixture with a dibutyl amine-monoisopropyl amine-adipic acid thickener, a surface agent, and

Need "Special Gears"?



-check with
FAIRFIELD!

How long will it take and how much will it cost?—These are points to check whenever you face the problem of setting up production facilities for gears. Special or unusual requirements in design, size, finish, tolerances, materials, and heat treatment are often "standard" at FAIRFIELD.

As one of America's largest independent producers of gears and differentials, Fairfield has every facility needed for quantity production of gears to meet virtually any need. One of the big advantages, when *YOUR GEARS* are made at *Fairfield*, is that you get the benefits of high production rates and big volume output on all types and sizes of gears. Your inquiry will receive prompt attention.

FAIRFIELD
MANUFACTURING CO.
2319 S. Concord Rd.
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Fine Gears and

Differentials for:

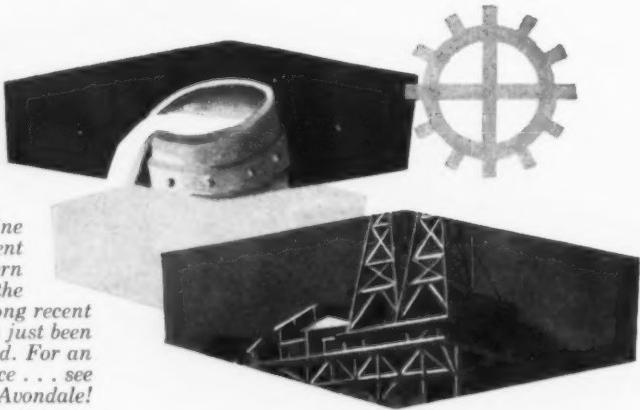
TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

a better Foundry service for you . . .

S E R V I C E F O U N D R Y

A DIVISION OF AVONDALE MARINE WAYS, INC.

Foundries have come a long way since the forge and bellows . . . today they are mechanized and specialized, offering a wide variety of products and services including engineering and design. This is certainly true of SERVICE FOUNDRY, a division of Avondale Marine Ways, Inc. In addition to a complete foundry and machine shop service, there is a large and competent staff of engineers, draftsmen, and pattern makers highly skilled in meeting the requirements of your industry. Among recent improvements, a new electric furnace has just been installed—the most modern of its kind. For an all-around better foundry service . . . see Avondale!



SERVICE FOUNDRY a division of Avondale Marine Ways, Inc.

416 Erato St. New Orleans, La. CANAL 3836

Two large industrial shears are shown side-by-side. The top image shows a shear with a gap of 30 inches, labeled "8' X 3/4" SHEAR, 30" GAP. The bottom image shows a similar shear with a gap of 24 inches, labeled "10' X 1/4" SHEAR, 24" GAP.

Our Line
Light and heavy
machinery
for all classes
of sheet
metal plate
and structural
work . . .

8' X 3/4" SHEAR, 30" GAP.

10' X 1/4" SHEAR, 24" GAP.

BERTSCH & COMPANY
CAMBRIDGE CITY INDIANA

A logo consisting of a stylized letter 'C' enclosed in a square frame, with the word 'CAST' written vertically next to it. To the right of the logo, the text reads:

ELECTRIC FURNACE
STEEL CASTINGS
CARBON • ALLOY • STAINLESS
SAND OR SHELL MOLDED

"C" Steel Castings—sand or shell molded—possess qualities far more interesting than the mere strength of steel. For, in addition to strength they provide more efficient design—better weight-strength ratio—and greater fatigue resistance, i.e., longer life and less replacement. Furthermore "C" Steel Castings, because they are truly foundry engineered from pattern to final casting, require minimum machining and provide better fit plus fast assembly. If you are interested in castings, the know-how, experience and engineering knowledge of our staff are at your service upon request.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE 1, PENNA.

MATERIALS ROUNDUP

a paraffin evaporation retardant. However, it was slow in removing paint and showed signs of deterioration after one month storage.

The report may be ordered from OTS, U. S. Department of Commerce, Washington 25. It costs \$1.00 per copy.

Special Alloy Features High Creep Strength

Self annealing, a new tin base solder offers high creep strength, yet it can be applied at low temperatures.

Alpha Metals, Inc., Jersey City, N. J., successfully tested it in several applications requiring high creep strength, such as soldering flanges to the barrels of wave guides.

Eliminates Distortion—Test data indicates that the use of this material in such applications, in addition to its strength, eliminates distortion resulting from excessive heat. It also ends low conductivity problems caused by oxide films produced from brazing fluxes.

Filament Lasts Longer

A new tungsten filament wire is said to have nine times the strength of ordinary filament wire. Developed at Westinghouse Electric Corp's lamp division, the material offers high resistance to shock and vibration.

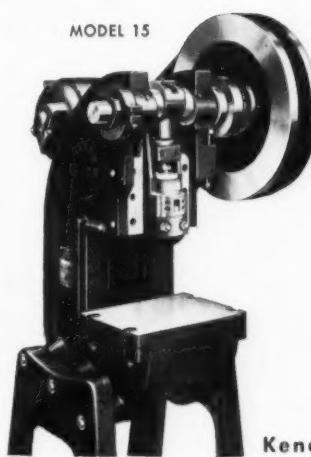
Several types of 12-v automotive lamps are now being made with the wire. Other types subject to shock, unusual vibration, or other rough service will be made.

Teflon Presses On

General Plastics Corp., Paterson, N. J., has completed testing a pressure adhesive backing for Teflon impregnated glass fabrics. The adhesive back is protected by a stripable paper.

KENCO 15-TON PUNCH PRESSES

MODEL 15



*Rugged... designed
for high precision,
steady production*

Here's the strongest press possible to build, regardless of weight. Multiple-rib frame is a rigid Sorbothane casting—75% stronger than any comparable frame. Massive, trouble-free crankshaft is one-piece, alloy steel for maximum strength... oversize driving mechanism engineered to prevent breakdown. Entire press is built to hold repairs and maintenance to a new low.

**Model 15-R—15-ton
deep-throat,
Rigid-Rib**



Same construction features as Model 15 above, but with 15" throat. Negligible deflection at full-capacity punching.

Kenco presses—14 models—2 to 15 tons
Write for literature

KENCO MANUFACTURING CO.

5211 Telegraph Road, Los Angeles 22, California

DESIGNED FOR DESIGNERS

Designers are often stumped when looking for new methods and new materials to dress up products. The inclusion of Hendrick perforated metal in product fabrication not only helps increase a product's overall attractiveness but also adds to its saleability as well! Perforated metal, masonite, rubber, plastic, and insulated board can be used in the design of: automobiles, furniture, buildings, appliances, notions, novelties, machines, equipment, and other products. Hendrick has hundreds of attractive choose from. In Commercially rolled metals and gauges to meet exact needs.



H E N D R I C K
M A N U F A C T U R I N G C O M P A N Y

37 Dundaff Street, Carbondale, Pa.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals

New Production Ideas

Equipment, Methods and Services



Rolling Mill Has Interchangeable Arbors

Rolling mills now feature interchangeable arbors. By removing the out-board and taking out two screws on each arbor, the arbor changes to provide correct rigidity for the form to be rolled. These sizes vary from 1-in. up to 3-in. Each arbor can be removed in about five minutes, or approximately 140 minutes for a 14-head rolling mill. Through use of the right sized arbor providing correct

rigidity, a smooth, clean sharp, wave-free form is rolled. This, of course, results in rolling to closer limits. With arbor interchangeability, cites the manufacturer, one machine easily does the work of two or more. In a matter of a few minutes, the arbors change to produce an entirely different form. This saves on floor space. (Mohawk Metal Forming & Tool Corp.).

For more data circle No. 34 on postcard, p. 145

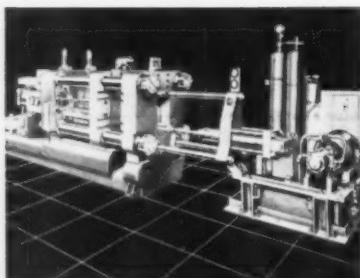


Fork Lift Driver Sits Over Left Front Fender

The operator sits above the left front fender for a clear view of the load on a new 35,000 lb. capacity pneumatic tire fork truck. The machine performs heavy lifting and tiering work around steel mills, construction sites and similar outside locations. A power shifted,

four speed transmission coupled with a torque converter and a 404 cu in. six cylinder Hercules gas engine provide power for operation through mud and snow and over rough terrain. Tire size is 14.00 x 24. (Clark Equipment Co.).

For more data circle No. 35 on postcard, p. 145

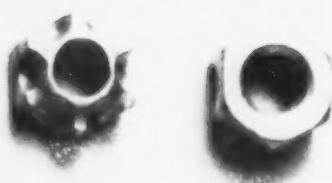


Diecasting Machines Work At High Pressures

Improved high pressure, cold chamber die casting machines come in 200, 400, 600 and 800-ton capacities. Refinements in both the self-contained clamp and injection ends result in better performance. Their clamp link-wedge locking mechanism, plus the extra heavy

platen and tie rods, locks and pre-loads dies to rated tonnage. The machine's heavy central screw adjustment is motorized and has push button operation for quick die set-up and tonnage control. (Hydraulic Press Mfg. Co.).

For more data circle No. 36 on postcard, p. 145



Locknuts Are Light and Corrosion Resistant

Lightweight steel locknuts for aircraft are lighter by as much as 43-pct. Cadmium plated to resist corrosion, they feature one-piece design and full wrenching area. Intended for applications up to 550°F, they come in 10-32 and

1/4-28 sizes. The nuts reuseability and other performance features conform to both AN-N-10 and MIL-N-25027 specifications, according to the maker. (Standard Pressed Steel Co.).

For more data circle No. 37 on postcard, p. 145

Quarter-inch steel plate is melted with an acetylene torch, but the supporting ALFRAX® BI brick stays cool enough to be held by hand.



Refractories...for really high temperature insulation

The problem of heat insulation at extreme temperatures is solved by two of Carborundum's refractories:

One is made of fused alumina "bubbles" or hollow spheres, bonded and high fired. These selected bubbles give proper balance between the number of surface temperature drops and total pore space (about 65% porosity) to effectively decrease heat flow between hot and cold faces. The alumina imparts high hot strength to the finished refractory, trade-marked ALFRAX BI. Under a load of 12½ psi and a temperature of 2732° F held for 1¾ hrs., less than 1% contraction occurred. No contraction whatever developed in 5 hour reheat tests at 3092° F. This combination of properties makes ALFRAX BI refractories unique in their ability to insulate at temperatures where other materials are impractical.

The other is FIBERFRAX® ceramic fiber, produced by blowing an alumina-silica fusion. Among its properties are high insulating values, light weight, resiliency, and corrosion resistance. All

are retained at 2300° F. In some cases, this fiber can be used successfully up to 3000° F. It is supplied in long and short staple, rope, board, paper, block, blanket, etc.

These products are but two of the many super refractories pioneered by Carborundum. Among them you are almost certain to find answers to your refractory and high-temperature problems. For help, fill in and mail this coupon today.

----- MAIL THIS COUPON TODAY -----

**Refractories Division,
The Carborundum Company, Perth Amboy, N. J., Dept. B37**

Please send me:

- Forthcoming issue of Refractories Magazine
 Bulletin on Properties of Carborundum's Super Refractories
 Here is a description of my high temperature problem.
Can you help me?

Name _____ Title _____

Company _____

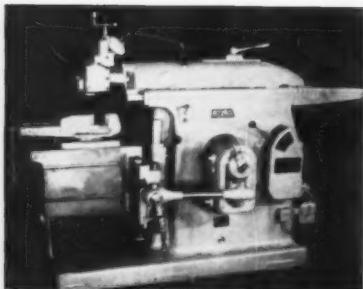
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CARBORUNDUM

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NEW EQUIPMENT

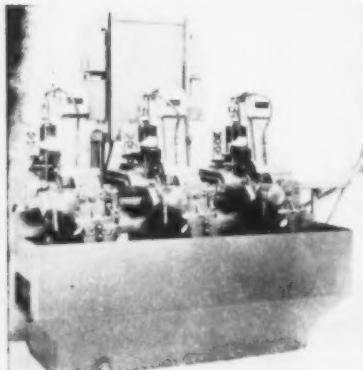


Shaping Machine Uses Carbide Cutting Tools

This high precision shaper has a stroke of 25 9/16-in. It permits a maximum shaping width of 28-in. and a shaping height of 17 5/14-in. The 7 1/2-hp motor is sufficient to allow the use of carbide tipped shaping-tools. All gears in the machine are hardened and

precision ground. The precision shaping machine's dimensions, capacities and features make it a versatile machine tool for any toolroom, the company says. The machine is recommended for both large and small shops. (Eric R. Bachmann Co., Inc.).

For more data circle No. 38 on postcard, p. 145



Belt Grinder Combines Three Steps Into One

Designed for high-speed volume production on ferrous and non-ferrous materials, this new wet-or-dry belt centerless grinder combines three operations in a single automatic sequence. Continuous through-feed permits use of a gravity feed hopper for small cylindrical parts. These it automatically ejects at its opposite end. Accommodating stock from 3/32 to 2 3/4-in.

diam, any length, this model maintains tolerances of 0.001-in. or less, at through-feed rates up to 35 sfpm. Typical grinding sequence, using series of progressively finer-grit abrasive belts, is rough grind, finish grind, and fine polish. The machine is also available with four grinding heads. (Engelberg Huller Co.).

For more data circle No. 39 on postcard, p. 145

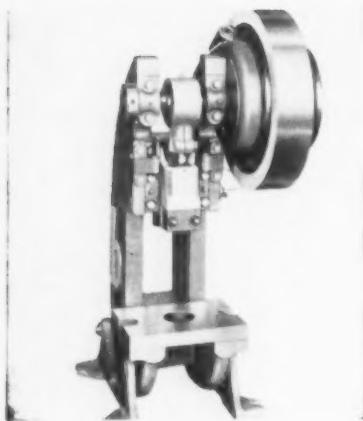


Device Returns Tools to Original Position

Safe retraction of potentially dangerous tool heads can be provided by a safety return device just introduced. An unusual feature of the unit is that, unlike conventional spring-actuated mechanisms, it exhibits no excessive build-up of the restraining force despite very long extension. The self-contained unit consists of a special spring with a

fully enclosed housing, a cable reel, cable and a threaded mounting stud. A socket head screw for attaching both the housing and the free end of the cable, and a socket wrench can be included with the standard device. The entire assembly is 5 1/16 in. diam. (Hunter Spring Co.).

For more data circle No. 40 on postcard, p. 145



Electric Clutch Automates Press Operations

Fully electric, a new clutch development, may change many press operations and bring automation to the press industry. Originally developed for flying cut-off operations, it now extends possibilities to such advanced uses as multiple press programming. Any number of presses can be tripped to synchronize in any desired pattern, although operating completely independent of one-another and in perfect synchronism. No mechanical

connection exists between presses. Each press thus can perform some portion of the total operation until a given part is complete and cut-off effected. Individual timing impulses to each press can be supplied by cam, tape, electronically or by other means. Tooling can thus be split between presses, simplifying construction and maintenance, permitting easy substitution of spares. (Benchmaster Mfg. Co.).

For more data circle No. 41 on postcard, p. 145

Makes reading easier... quicker

**KODAK
Industrial
X-ray Film,
Type AA**



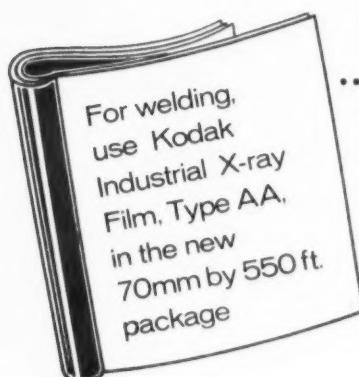
Kodak Industrial X-ray Film, Type AA, gives you greatly increased speed—a film characteristic that brings the radiographer greatly extended possibilities.

As an example: by using reduced kilovoltage and usual exposure time, greater radiographic contrast and easier readability are obtained.

In addition to ranging up to double the speed, this new film retains the fine sensitivity characteristics which made Kodak Type A the most widely used x-ray film in industry.

Kodak Industrial X-ray Film, Type AA, can save you time and extend the usefulness of your present radiographic equipment. Get all the details. Contact your x-ray dealer or Kodak Technical Representative.

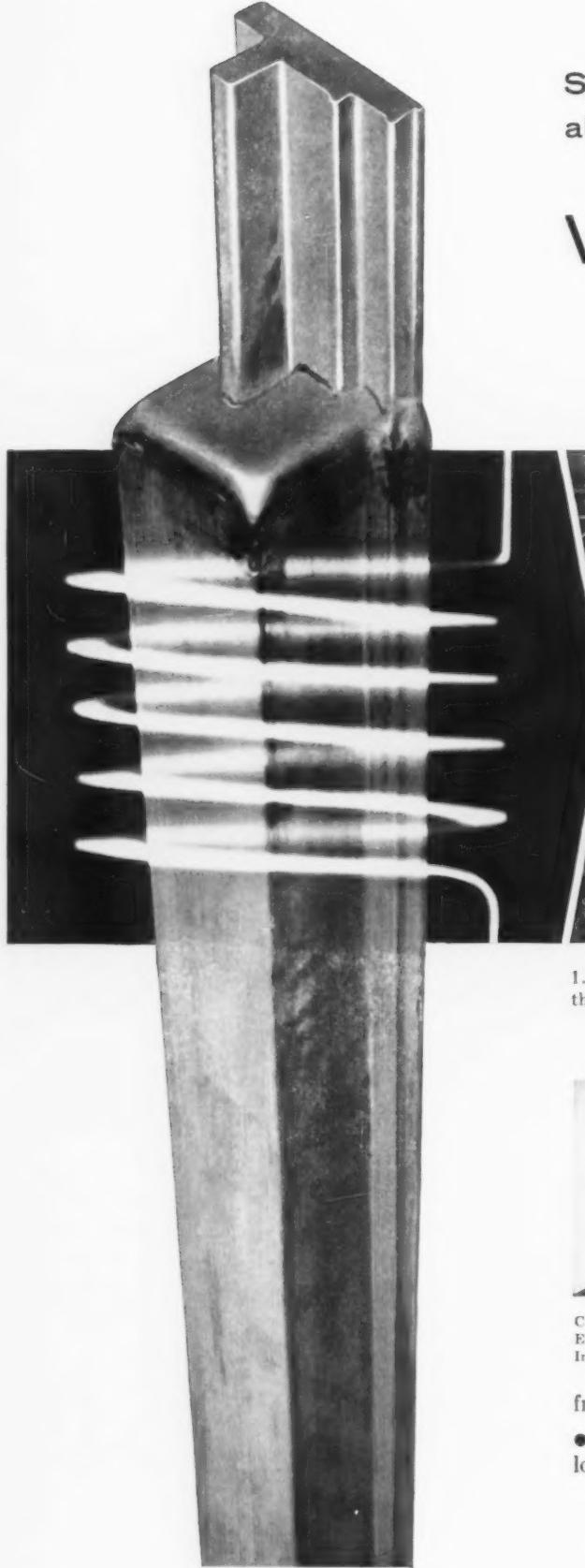
**EASTMAN KODAK COMPANY, X-ray Division
Rochester 4, N.Y.**



Read what the new Kodak Industrial X-ray Film, Type AA, does for you:

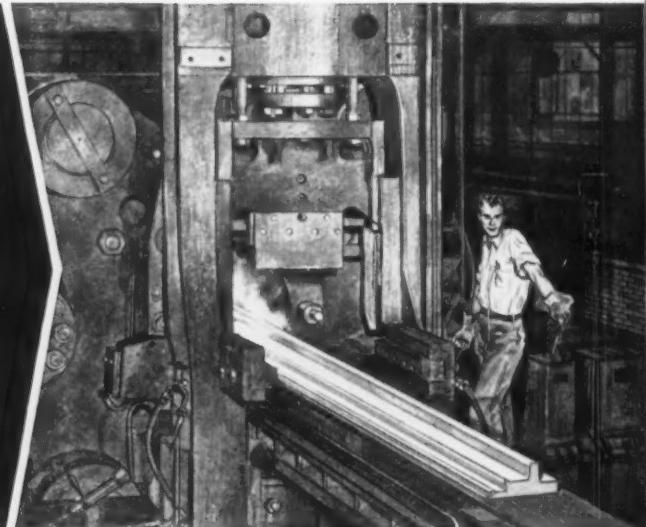
- Reduces exposure time—speeds up routine examinations.
- Provides increased radiographic sensitivity through higher densities with established exposure and processing technics.
- Gives greater subject contrast, more detail and easier readability when established exposure times are used with reduced kilovoltage.
- Shortens processing cycle with existing exposure technics.
- Reduces the possibility of pressure desensitization under the usual shop conditions of use.

Kodak
TRADE MARK



Speed for
aluminum extrusion . . .

Westinghouse



1. Greater efficiency in aluminum billet extrusion results from the speed and adaptability of Westinghouse induction heating.

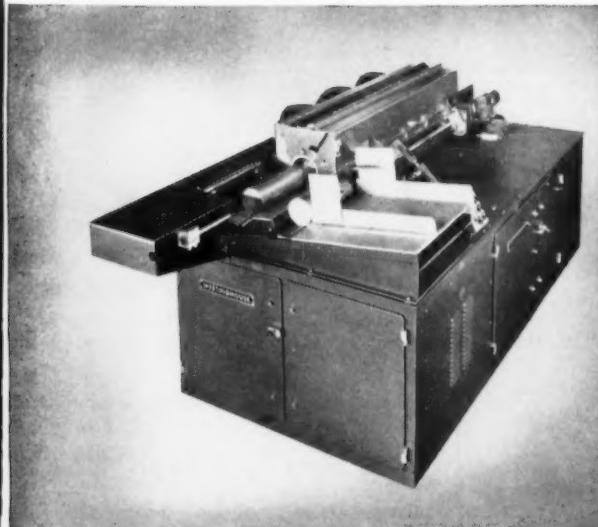


C. P. Bernhardt
Engineering Manager,
Induction Heating Dept.

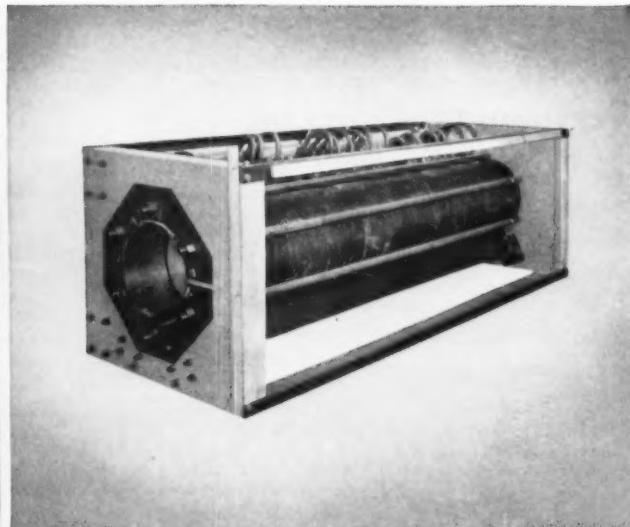
EXAMPLE: "Five thousand pounds an hour of 6-inch aluminum billets", reports Carl Bernhardt, "are heated to 1,000°F for heavy extrusion press operation." In supplying induction heating for this customer, Westinghouse saved 37% of the floor space needed for conventional furnace operation. Most important, high operating efficiency results from these five advantages in speed and flexibility:

- Short, 3-minute, start-up time. Stand-by heat losses are low.

induction heats billets on the run



2. Heating 6- or 8-inch billets to 1,000°F, this Westinghouse induction unit delivers up to 5,000 lbs of billets an hour.



3. Westinghouse coil design and engineering assures uniform heating from billet core to surface.

- Up to 80% cut in maintenance time and costs.
- Longer die life due to uniform billet heating . . . accurate, repetitive temperature control.
- Cooler, more productive working conditions.
- Pushbutton, automatic cycling of billet heating and handling directly to the extrusion press pickup.

For problem solving, call on Westinghouse technical leadership in induction heating research, design and engineering. You can be sure of complete service, too, through installation field engineering and follow-up. See your local Westinghouse industrial heating sales engineer or write, Westinghouse Electric Corporation, Induction Heating Dept., 2519 Wilkens Ave., Baltimore 3, Md. J-10450-X

The Westinghouse Heat-Treating Family

GAS • ELECTRIC • INDUCTION

March 7, 1957

YOU CAN BE SURE...IF IT'S
Westinghouse

NEW EQUIPMENT



FOR LESS THAN \$45 YOU GET 12 SETS, EACH SET GROUND READY TO GO

Men would not accept either idea at first . . .

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than \$45 you get a dozen sets of $\frac{3}{4}$ -16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime.

FREE: "Selecting the Proper Die Head for the Job".

THE EASTERN MACHINE SCREW CORPORATION

21-42 Barclay St., New Haven, Conn.

Tailgate Elevates Fast

This electric elevating tailgate lifts 600 lb in 15 seconds with the touch of a button. With it, one man loads and unloads trucks quickly. The tailgate is geared to

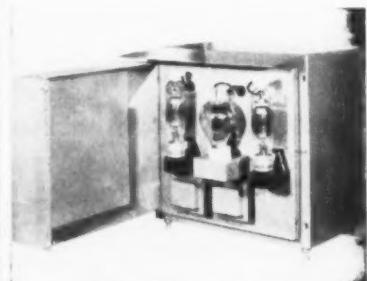


eliminate battery drag. Its motor is reversible, and has built in motor brake to prevent coasting. The tailgate fits $\frac{1}{2}$ and 1-ton trucks. (Mid West Body & Mfg. Co.).

For more data circle No. 42 on postcard, p. 145

Tubes Rectify Drive

An electronic adjustable speed dc drive uses tubes for rectification. The drive motor is also the tachometer. It comes in five sizes. These start at $\frac{3}{4}$ hp and go through 3



hp. They provide electronic control of dc motors from ac power. Each offers a wide, smooth, stepless adjustable speed range. It is a 50 to 1 range, without field weakening. The unit gives any desired speed from 35 to 1750 rpm. (Weltronic Co.).

For more data circle No. 43 on postcard, p. 145

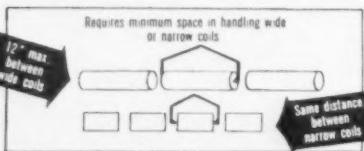
Handling Coil Stock?

CHECK THESE
C-LIFTER ADVANTAGES

- C-Lifter handles wide range of coil sizes
- Requires minimum of only 10" to 12" between piles — saves storage room
- 1 man operation — eliminates hookers
- Positive grip on coil — no damage to material

• C-F Coil Lifters are saving time and labor in many plants and warehouses because they can pick up, carry and set down a coil of steel faster and safer than any other method. Infinite jaw

openings permit handling a very wide range of coil widths... carrying legs open fast, stay open until operator closes them on coil. Narrow legs require minimum space between piles — a space saving advantage. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for illustrated Bulletin.



CULLEN-FRIESTEDT CO.

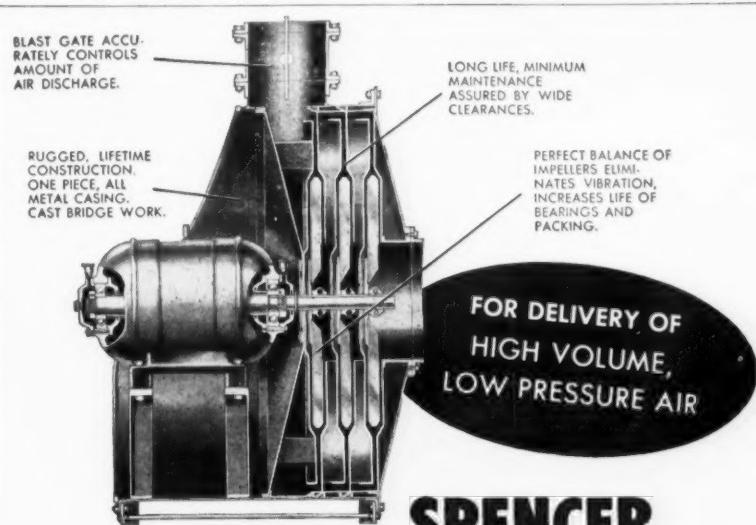
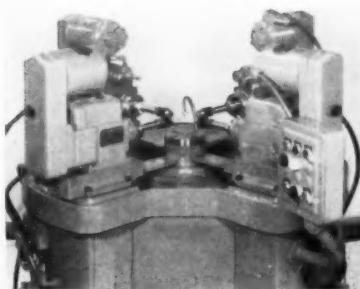
1303 South Kilbourn Avenue • Chicago 23, Illinois

Multi-operation Unit Cross-drills Parts

A special automatic cross-drilling machine performs multiple applications rapidly. This is done by four horizontally-mounted drill heads, located on a common plane and pivoting around the axis of the workpiece through an arc of 270° . Feed movements are hydraulic-powered. A simple 4-position rotary drum switch controls the sequence of operation of the heads. Thus, complete operating cycles can be set up or changed in an instant. Cycles eliminate waste time which occurs in manually-controlled sequence drilling. Control of the four heads is interlocked to prevent drill interference. A broad range of multiple operations can be performed at high speed. For example, heads operate in a pre-set sequence for cross-drilling, but can also operate simultaneously when

holes do not intersect. Through-drilling can be performed by one head, followed immediately by reaming with an opposed head. In the same cycle, the workpiece can then index 90° for counterboring and chamfering with the other two heads. (Russell T. Gilman, Inc.).

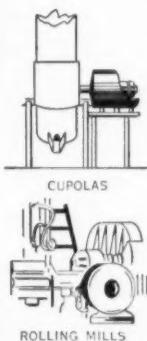
For more data circle No. 44 on postcard, p. 145



SPENCER

Turbo-Compressors are PREFERRED

by Equipment Manufacturers and for Replacement

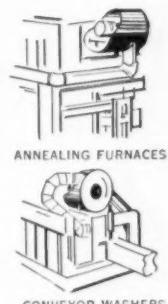


You'll see Spencer "blowers" . . . with the familiar "sugar-scoop" design . . . on a wide variety of equipment in foundries and metalworking plants everywhere.

Performance is the reason. Experienced metals men know you just can't beat the rugged reliability, the proved-in-use performance of a Spencer Turbo.

Simple, built-to-last construction . . . mounting that requires no special foundation, no bolting down . . . discharge in any of eight positions . . . quiet operation . . . use of power proportional to amount of air used . . . these are a few of the reasons why SPENCER is preferred.

Capacities from $1/3$ HP to 1,000 HP, up to 20,000 CFM, 4 oz. to 10 lbs. pressure.



OTHER QUALITY
SPENCER PRODUCTS

**The SPENCER
TURBINE COMPANY**
HARTFORD 6, CONNECTICUT

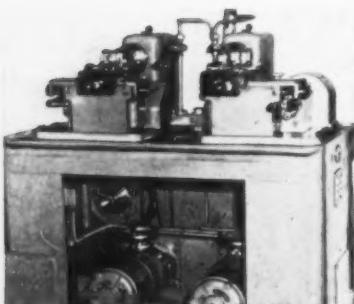


Removes Buff Compound

A synthetic detergent removes buffing compounds. Its unique anti-staticising and synergistic properties wet the metal surface; this reduces interfacial tension between metal and the compound. Its properties permit the compound to slough off in sheets. (Conversor Chemical Corp.).

For more data circle No. 46 on postcard, p. 145

NEW EQUIPMENT



Dual Head Lathe Offers Fast Production

This high-precision, semi-automatic lathe features a dual head arrangement for fast production. Its dual head setup permits turning of intricate forms at high production rates. The lathe's operation is extremely simple. An operator loads a workpiece into the chuck actuated by a pedal. He engages a

slide motion and spindle drive by depressing the starting handle. The head automatically stops at the end of each cycle. During the operation of the first head the operator changes the workpiece in the stopped second head. Coordinate cam action insures precision control of the cutting tool. It has speeds to 3500-rpm. The chuck capacity (2½ in.) can be increased with optional devices. The lathe is a product of a 50-year-old Swiss manufacturer. (Carl Hirschmann Co., Inc.).

For more data circle No. 47 on postcard, p. 145

**GET ➤ GREATER GRINDER PRODUCTION
BETTER SURFACE FINISHES
LOWER PRODUCTION COST**

*From all your Surface Grinders,
new or old*



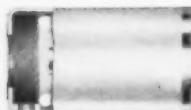
Specify

POPE HEAVY DUTY,
MOTORIZED
SPINDLES

POPE 1, 2 and 3 HP, 1800 or 3600 RPM Surface Grinder Spindles:

- assure continuous production of accurate parts.
- revolve accurately under the heaviest loads.
- permanently lubricated (Pope System) for the life of the bearings.
- have the rigidity to support diamond wheels and to produce good work.
- have the extra rigidity for crush dressing and form grinding.

WRITE FOR PRICE AND DELIVERY.



LOOK AT THE
BEARINGS!
permanently
preloaded

These super-precision, double row cylindrical roller bearings have the capacity to assure smooth, chatter-free operation over a long life — give the Spindle the ability to rough off surplus

metal fast but maintain its built-in precision for producing fine finishes.

Separate super-precision ball thrust bearings eliminate endwise movement of the shaft in either direction.

No. 117

POPE®

ENGINEERS AND BUILDS STANDARD AND SPECIAL
PRECISION ANTI-FRICTION BEARING SPINDLES
FOR EVERY PURPOSE

POPE MACHINERY CORPORATION • 261 RIVER STREET • HAVERHILL, MASS.

Established 1920

Unit Crimps Pipe

Rugged and lightweight, this compound leverage pipe crimper multiplies hand pressure to provide crimping power with minimum effort. With capacity up to 20-gage



galvanized steel, this handy tool makes easy the reduction of sheet metal pipe diameters. Featuring 1¼-in. blades, it makes two crimps each time jaws are compressed. (Niagara Machine & Tool Works). For more data circle No. 48 on postcard, p. 145

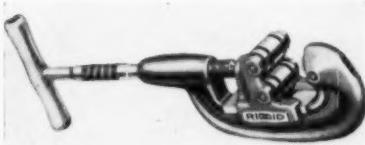
Air Cylinders

New air cylinders give long life under severe conditions and facilitate maintenance with simple tools. A capsule type gland of alloy steel is designed especially for heavy duty service. (Densmore Engineering Co.).

For more data circle No. 49 on postcard, p. 145

Tool Cuts Pipe

Designed for easy pipe cutting, a new tool has a power drive for heavy duty use. An extra wide roll built into the cutter features double the bearing surface on pipe. A new wide-roll sets and holds revolving pipe at a perfect right angle. The user thus is assured of quick, clean



starts for perfect tracking and straight cuts. Time consuming changes to special rolls are not necessary. A large screw handle assures easier cutting adjustment for hand or power use. (The Ridge Tool Co.).

For more data circle No. 50 on postcard, p. 145

Drive Works Fast Speed

Single-stage torque converters now operate with high-speed diesel and gasoline engines. They are for engines producing from 30 hp at 1450 rpm to 212 hp at 3200 rpm. Specific torque ratings are 165, 200, 240, 285 and 330 ft lb, depending on the impeller blading selected by user. (Twin Disc Clutch Co.).

For more data circle No. 51 on postcard, p. 145

Setup Makes Nitrogen

A nitrogen generator has a wide controlled-hydrogen-content range. It produces oxygen-free nitrogen from ammonia in the users plant. The setup draws nitrogen from both air and the ammonia, rather than from the ammonia alone. Because the reaction is exothermic, no external heat is necessary, eliminating the expense of replacing burnt-out heating elements periodically. (Baker & Co., Inc.).

For more data circle No. 52 on postcard, p. 145

ARMSTRONG
SET-UP
and
HOLD-DOWN
TOOLS

ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents. Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

Write for Circular

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"
5209 W. Armstrong Ave.
Chicago 30, U.S.A.

STEEL MEN!

WHAT IS THE COST OF A "CORHART BALANCED TANK"?

BECAUSE Corhart Electrocast sells for several times more than ordinary clay blocks, some operators have gotten the impression that a Corhart tank costs three or four times more than an all-clay furnace.

Nothing, however, could be further from the truth. By balancing his furnace with the proper amount of Electrocast, the average Corhart customer adds so little to the installation cost that the difference is repaid by a fractional part of the extra production gained.

If you have never obtained an estimate for a Corhart Balanced Tank, (a tank with all vulnerable spots fortified by Electrocast), we believe you will be more than surprised at the low cost for which this ideal type of installation can be made . . . Send us the

plans of your furnace, with a brief description of its past history. Using the experience gained in designing 65 Corhart Balanced Tanks, we will gladly recommend the amount and location of Electrocast needed to balance your furnace, and submit for your consideration complete blue-prints and quotations . . . This service will cost you nothing, but it will probably prove the most interesting reading of the year. No obligation—and no high-pressure "follow-up." Address: Corhart Refractories Co., Incorporated, 16th and Lee Streets, Louisville, Kentucky.



**CORHART
ELECTROCAST
REFRACTORIES**



**CORHART 104
ELECTROCAST
REFRACTORY**

The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, Incorporated. Corhart Refractories Co., Incorporated, 1600 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471.

WE RAN this ad for a Corhart Electrocast Refractory a little over 25 years ago—back when only a handful of glass manufacturers would think of using this new product, "one of the world's highest-priced refractories". Yet today virtually every furnace in the glass industry uses Corhart Electrocast . . .

Today Corhart 104 is new in the steel industry. And although it too is "one of the world's highest-priced refractories", it offers open-hearth furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to the glass industry.

Would you like to have complete data? Address: Corhart Refractories Co., Incorporated, 1628 West Lee Street, Louisville 10, Kentucky, U.S.A., SPring 8-4471.

Mills Resort To Hard Sell

Mills are fighting harder for markets. Tight products used as bait.

Some users going overboard on inventory cutbacks. Run risk of being caught short.

■ Steel mills are counting on a turn for the better in demand for some products during the next three months. Meanwhile, the scramble for available business in sheets, strip, and other products in good supply is becoming more intense. Where they can, mills are tying in sales of easier products with those in stronger demand.

The tie-in sale gives the advantage to those mills producing a wide variety of products. They are using plates, structurals, and pipe to jack up sales of sheets, strip, bars, and butt-weld pipe. The mill without these "bargaining" tools is finding the going that much tougher. In some cases, warehouses are using the same tie-in technique.

Don't Get Burned — Steel users everywhere apparently are taking their inventory cue from the auto and appliance makers. They're going overboard on inventory cutbacks. And it looks as though the auto industry, at least, plans to play it close to the vest for at least two more months. Two of the Big Three automakers have stepped up their April steel orders, possibly with the intent of increasing auto output the following month.

Some steel customers are taking a calculated risk in overplaying their inventory reduction policy. They're assuming that because some forms of steel are in plentiful supply, this situation will continue through the year. But they may be overlooking one important point: Automotive steel inventories have been cut to rock bottom. A turn for the better in new car sales will bring an abrupt upturn in steel demand from the automakers. When this happens delivery promises will automatically stretch out — and

some users could then find themselves caught short.

Sheet Cutback — Another point to remember: The mills are gradually inching back on their production of sheets. More of them are switching to the rolling of light plate on sheet-strip mills.

The easier tone of the market is putting the mills back into a position where they can revert to normal maintenance policies. A large Midwestern mill, for example, has gone back to the usual cycle of having one of its blast furnaces down for repair in any given month. Some of this work is long overdue.

Export Outlook — Mills are taking a closer look at export market, but have not done too much about it thus far. Trouble is that export demand is largely for plate and structurals — two products still in short supply domestically. American steelmakers can do little or nothing on the heavier sections of plate for foreign customers.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week	Last Week	Month Ago	Year Ago
	2,435	2,456	2,496	2,449
Ingot Index				
(1947-1949=100)	150.2	152.9	155.4	154.5
Operating Rates				
Chicago	93.0	94.0*	94.0	100.0
Pittsburgh	96.0	97.0	99.0	102.0
Philadelphia	104.0	104.0*	105.0	104.5
Valley	92.0	93.0*	96.0	97.0
West	100.0	102.0*	100.0	96.0
Buffalo	95.0	95.0	105.0	105.0
Cleveland	92.0	97.0*	99.0	106.0
Detroit	103.0	106.0	100.0	101.0
S. Ohio River	82.0	92.0*	84.0	95.0
South	95.5	95.0	95.0	96.0
Upper Ohio R.	100.0	106.0*	104.0	101.0
St. Louis	95.5	82.0	99.5	106.0
Northeast	76.0	76.0	31.0	89.0
Aggregate				
	95.5	96.0	97.5	99.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)				
	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.663	5.622	5.174
Pig Iron (Gross Ton)	\$64.00	\$62.90	\$62.80	\$59.09
Scrap, No. 1 hvy (Gross ton)	\$50.50	\$52.17	\$53.83	\$47.83
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper electrolytic	32.00	32.00	34.00	46.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	99.00	98.375*	102.50	101.25
Zinc, E. St. Louis	13.50	13.50	13.50	13.50

*Revised

Pig Iron Prices Jump \$2 Per Ton

Major pig iron producers increase prices following boost in iron ore cost.

Industrial fastener price advance reflects higher steel costs.

■ Higher costs forced an upward break in pig iron and industrial fastener prices this week.

Major pig iron producers increased prices \$2 per ton, reflecting advances in iron ore and other costs during the last several months. Differentials for silicon also were increased from the previous 50¢, to 75¢ per ton for each 0.25 pct silicon. For manganese content, the differential is now 50¢ per ton for each 0.25 pct as opposed to the previous 0.50 pct. Silvery iron prices were tentatively unchanged.

Fasteners Up—Lamson & Sessions has taken the lead in advancing fasteners prices an average of 5 pct. Other fasteners makers are expected to follow suit.

U. S. Steel Corp. and Republic have followed Bethlehem's lead in advancing mill base prices on rail and track accessories (see page 190). THE IRON AGE Finished Steel Composite, mirroring these revisions, advanced to 5.670¢ per lb.

Reflecting domestic price changes, U. S. Steel Export Co. advanced export bases on standard rails, light rails, joint bars, and tie plates. Youngstown Sheet & Tube has increased alloy grade extras on cold finished alloy steel bars.

SHEET AND STRIP — While the sheet market continues generally off, there are indications from Detroit that April orders from the

automakers have picked up. Both Ford and Chrysler are reported to be planning production increases. However, most General Motors car schedules have been slightly cut back. Feeling at Detroit is that a pickup in automotive ordering of steel will show up in April.

Meanwhile in Cleveland rolling time is still available on both hot- and cold-rolled sheet. In some cases about 10 to 15 pct of the sheet tonnage offered by the mills has been rescheduled into April. Warehouses in the area are reported unloading prime cold-rolled sheet and some off-grade light plate at less than mill prices.

West Coast warehouses are pushing their salesmen out to hustle for both hot- and cold-rolled sheet business. Their inventories are bulging and customer buying is off.

May orders for flat-rolled products seem to be coming in at a better clip than April's, according to one large Philadelphia area producer.

Pittsburgh, too, indicates that second quarter ordering is at a good rate.

A good sign at Chicago is fact that strip producers are not eagerly booking plate business as they had until now. However, warehouses there continue to complain of falling demand for sheet and strip.

BARS — Hot-rolled bars are available at Cleveland for April delivery. However, February and March schedules are full for the area's producers. Auto cutbacks for bar have been replaced by demand from construction industry

for reinforcing rod and bar.

While hot-rolled bar is in fairly good demand in Philadelphia market, the bottom has dropped out of the cold-finished bar market.

At Pittsburgh even hot-rolled bars are sluggish.

There's mild strength in hot-rolled bars at Chicago, but cold finished bars are not showing the same power. Cold finishers apparently are holding strong stocks of material in the 2 to 4 in. diam. range.

PIPE AND TUBING—Seamless tubing is being booked quarter by quarter in Cleveland area and mill schedules are filled almost as soon as they are opened. On the other hand, there's March tonnage available for butt-weld pipe.

The same situation exists in the Philadelphia market where one supplier is willing to sell 5 tons of electric-weld if customer will take 15 tons of butt-weld pipe.

West Coast mills report open time as flood of imports and fall-off in the number of new housing starts is giving them open time on pipe in sizes of ½ in. through 4 in.

Oil country goods are becoming an increasingly tight item in the Chicago market. Seamless pipe and tubing are also in heavy demand.

PLATES AND SHAPES—Light plate prices at Cleveland have loosened because of the heavy tonnages being rolled on sheet mills. Plates and structurals are the only steel products on which the area's warehouses are not in good inventory.

PURCHASING AGENTS' CHECKLIST

Consumer ordering of wire products is on the upswing. **P. 86**

Tinplate producers begin shipping product in coil form to a number of canmakers. **P. 87**

Will there be more pig iron capacity built on the West Coast? **P. 107**

COMPARISON OF PRICES

(Effective March 5, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	March 5 1957	Feb. 26 1957	Feb. 5 1957	March 6 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.825¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50

Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.95	\$9.95	\$9.95	\$9.05
Tin plates, electro (0.50 lb.)	8.65	8.65	8.65	7.75
Special coated mfg. terne	9.20	9.20	9.20	7.85

Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50

Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢

Rails: (per 100 lb.)				
Heavy rails	\$5.275	\$5.075-\$5.275	\$5.075	\$4.725
Light rails	6.25	6.00-\$6.25	6.00	5.65

Finished Steel: (per net ton)				
Rerolling billets	\$74.00	\$74.00	\$74.00	\$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00

Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225

Finished Steel Composite: (per pound)				
Base price	5.670¢	5.663¢	5.622¢	5.174¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

PIG IRON Dollars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

← To identify producers, see Key on P. 188 →

Base price cents per lb f.o.b. mill

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.	Product	201	202	301	302	303	304	316	321	347	403	410	416	438
Birdsboro, Pa. B6	64.50	65.00	65.50	66.00		Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	16.00	27.75	16.25
Birmingham R3	58.50	59.00*				Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Birmingham W9	58.50	59.00*	61.00			Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Birmingham U4	58.50	59.00*	61.00			Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Buffalo R3	64.50	65.00	65.50	66.00		Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Buffalo H1	62.50	63.00	63.50			Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Buffalo W6	62.50	63.00	63.50	64.00		Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Chester P2	64.50	65.00	65.50			Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Chicago I4	64.50	65.00	65.50	66.00		Wire CF; Rod HR	—	39.25	40.25-	41.00-	44.00	43.75	66.75-	50.50-	59.25-	34.50	31.00	31.50	31.50
Cleveland A5	62.50	63.00	63.00	63.50	67.50†			40.50	41.25	41.75	42.25	42.50	67.00	51.00	59.50	—	—	—	—
Cleveland R3	64.50	65.00	65.00	65.50															
Duluth I4	64.50	65.00	65.00	65.50	69.50†														
Erie I4	64.50	65.00	65.00	65.50	69.50†														
Everett M6	64.50	65.00	65.50																
Fontana K1	70.50	71.00																	
Geneva, Utah C7	62.50	63.00																	
Granite City G2	66.40	66.90	67.40																
Hubbard Y1			63.00																
Midland C11	64.50																		
Minnequa C6	64.50	65.00	65.50																
Monessen P6	62.50																		
Neville Is. P4	64.50	65.00	65.00	65.50															
Monaca T1	63.00	63.50	64.00																
Pittsburgh U1	62.50	63.00	63.50																
Sharpville S3	64.50	65.00	65.50																
So. Chicago R3	64.50	65.00	65.00																
Sweden A2	64.50	65.00	65.50	65.50															
Toledo I4	64.50	65.00	65.00	65.50															
Troy, N. Y. R3	66.50	67.00	67.50	68.00	72.50														
Youngstown Y1	67.60	68.00	68.50																

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4; Philadelph., D5.

Bar: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1; New Bedford, Mass. (.25¢ per lb higher); R6; Gary, U1 (.25¢ per lb higher).

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structural: Baltimore, A7; Massillon, O., R3; Chicago, I4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Philadelphia, D5; Vandegrift, Pa., U1; Gary, U1.

Forgings billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1.

DIFFERENTIALS: Add .75¢ per ton for each 0.25 pct silicon or portion thereof over base (.175 to 2.25 pct except few phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct. 5¢ per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel.

* Add \$1.00 for 0.51-0.69 pct phosph. + Intermediate low phos. + Add \$1.00 for 0.31-0.50 pct phosph.

Silvery Iron: Buffalo, H1, \$72.50; Jackson, J1, J4 (Globe Div.), \$71.50; Niagara Falls (15.01-15.50), \$99.50; Keokuk (14.01-14.50), \$110.00; (15.51-16.00), \$105.00. Add \$1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): \$64.00. Add \$1.00 premium for all grades silvery 6 pct to 14 pct.

Scrap Hits Lowest Level in Year

Major markets continue their decline. Attempts to put a floor under the market fail.

Trade is now unsure of future trends. But collections are slow and no surplus exists.

■ The steady price decline of the last three months continues. Declines of \$3 for No. 1 grades are not out of the ordinary.

Attempts to firm the market have failed in most areas. Mill offers at lower prices meet with only scattered resistance. In some markets, tonnage requirements are so small that brokers have little trouble covering.

But in spite of the rapid decline, little scrap lingers in dealer yards. Collections are not good, and no overabundance of good scrap exists. But dealers are reluctant to hold on to their scrap, and hesitate to hold inventory on a falling market.

Buck Trend — Railroads show signs of bucking market. They are offering less scrap, hoping for higher prices in the weeks ahead. In general, however, scrap continues to move at lower prices, although there are exceptions in minor areas.

Philadelphia was the only major market to resist a substantial drop. Export continues active.

On the basis of sharp declines in Pittsburgh and Chicago, THE IRON AGE Scrap Composite continued its drop, to \$50.50, the lowest level since March, 1956.

West Coast areas also resisted expected drops. These markets are bolstered by continued strong export demand from Japan. A major mill purchase established price levels at current quotations.

Pittsburgh — Prices fell \$1 to \$2 as mill purchases failed to put a floor under the market. One area mill bought scrap at \$52 for No. 1 heavy melting, \$45 for No. 2 and \$43 for No. 2 bundles. A mill on the fringe of the district came in at prices that were slightly higher. Both buys were for relatively small tonnages and most grades slumped a dollar under the mill figures. Short turnings were pegged at \$41 on a mill purchase. Low phos is down \$2 in line with general market weakness.

Chicago — Prices dropped again sharply this week as major consumers began to receive offers based on lower prices offered last week. Some steelmaking grades slipped as much as \$3, but No. 2 grades held comparatively firm. The market appeared to be stagnant early this week, but mill offers to buy at the new, lower prices were actively sought by brokers.

Philadelphia — Secondary steelmaking grades dropped \$1 and \$1.50 in a relatively quiet domestic market, as did electric furnace bundles and some railroad grades. Brisk export activity is keeping scrap moving through dealer yards.

New York — The market continues to decline, with steelmaking grades off \$1.50. Talk of tonnages at higher prices persists, but they appear to be small, non-representative purchases not reflecting the current market. The tugboat strike continues to cripple exports, helping to weaken prices here.

Detroit — Prices declined another

\$2 to \$3 on the basis of local and outside orders. Another local mill is expected to come into the market later this week in the same price range. The trade expects the market to firm at about present levels.

Cleveland — A Valley mill made a heavy purchase of No. 2 heavy melting at \$46, or down \$2, thus establishing working levels in a hectic market. Blast furnace scrap was also purchased in the Cleveland area at about \$7 under a month ago, but this remains a weak market.

St. Louis — Movement of scrap continues to lag. Present prices are not bringing scrap out. The market is at a standstill, with neither buyers nor sellers eager to act. Some items are down a dollar or less.

Birmingham — The market continues weak in most categories. The largest openhearth mill continues out of the market. Cast continues weak, but railroad grades are looking up. Dealers report their intake is also off.

Cincinnati — The market dropped another \$3.50 on monthly price announcement by two area mills. Tonnage was down on both purchases and brokers are having little trouble covering them at depressed prices. End of drop is not in sight.

Buffalo — Prices of steelmaking grades are down \$2 on the basis of sales this week. Railroad specialties are also off. But dealer supplies are still low, in spite of a continuing strike at a major consumer.

Boston — Prices for steelmaking and blast furnace grades are generally off \$1. Export is weak and only one domestic mill is in the market. The outlook indicates another drop is coming.

West Coast — Contrary to expectations, scrap prices remain unchanged in San Francisco, Los Angeles and Seattle. A major mill purchase established quoted prices. Export to Japan continues strong, bolstering the Coast market.

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venient, direct action controls respond with "full feel" for quick, accurate load placing. You can enjoy this snappy performance month after month with a minimum of downtime for servicing or repairs because Bucyrus-Eries are designed throughout for specific lifting capacities. Speed, power and weight are perfectly balanced for maximum efficiency.

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SCRAP PRICES (Effective March 5, 1957)

Pittsburgh

No. 1 hvy. melting	\$50.00 to \$51.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	50.00 to 51.00
No. 1 factory bundles	54.00 to 55.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	50.00 to 51.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and ms. turn.	36.00 to 37.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Low phos. punch'gs plate	54.00 to 55.00
Heavy turnings	45.00 to 46.00
No. 1 RR. hvy. melting	55.00 to 56.00
Scrap rails, random lgth.	67.00 to 68.00
Rails 2 ft and under	70.00 to 71.00
Rkt. steel wheels	68.00 to 69.00
RR. spring steel	68.00 to 69.00
RR. couplers and knuckles	68.00 to 69.00
No. 1 machinery cast	56.00 to 57.00
Cupola cast	49.00 to 50.00
Heavy breakable cast	47.00 to 48.00

Chicago

No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'gs plate	54.00 to 55.00
Low phos. 3 ft and under	53.00 to 54.00
No. 1 RR. hvy. melting	52.00 to 54.00
Scrap rails, random lgth.	60.00 to 61.00
Rerolling rails	60.00 to 62.00
Rails 2 ft and under	64.00 to 65.00
Locomotive tires cut	57.00 to 58.00
Cut bolsters & side frames	55.00 to 56.00
Angles and splice bars	60.00 to 61.00
RR. steel car axles	75.00 to 76.00
RR. couplers and knuckles	54.00 to 55.00
No. 1 machinery cast	49.00 to 50.00
Cupola cast	43.00 to 44.00
Heavy breakable cast	42.00 to 43.00
Cast iron brake shoe	42.00 to 43.00
Cast iron wheels	51.00 to 52.00
Malleable	60.00 to 61.00
Stove plate	42.00 to 43.00
Steel car wheels	55.00 to 56.00

Philadelphia Area

No. 1 hvy. melting	\$55.00 to \$56.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 dealer bundles	55.00 to 56.00
No. 2 bundles	45.00 to 46.00
No. 1 busheling	55.00 to 56.00
Machine shop turn.	41.00 to 42.00
Mixed bor. short turn.	43.00 to 44.00
Cast iron borings	43.00 to 44.00
Shoveling turnings	45.00 to 46.00
Clean cast. chem. borings	47.00 to 48.00
Low phos. 5 ft and under	61.00 to 62.00
Low phos. 2 ft and under	62.00 to 63.00
Low phos. punch'gs	63.00 to 64.00
Elec. furnace bundles	59.00 to 60.00
Heavy turnings	53.00 to 54.00
RR. steel wheels	66.00 to 67.00
RR. spring steel	66.00 to 67.00
Rails 18 in. and under	74.00 to 75.00
Cupola cast	50.00 to 51.00
Heavy breakable cast	55.00 to 56.00
Cast iron car wheels	61.00 to 62.00
Malleable	65.00 to 66.00
Unstripped motor blocks	41.00 to 42.00
No. 1 machinery cast	57.00 to 58.00

Cleveland

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	48.50 to 49.50
No. 2 bundles	35.00 to 36.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	26.50 to 27.50
Mixed bor. and turn.	31.50 to 32.50
Shoveling turnings	31.50 to 32.50
Cast iron borings	31.50 to 32.50
Cut struct'r'l & plates, 2 ft & under	54.00 to 55.00
Drop forge flashings	46.00 to 47.00
Low phos. punch'gs. plate	47.00 to 48.00
Foundry steel, 2 ft & under	51.00 to 52.00
No. 1 RR. heavy melting	51.00 to 52.00
Rails 2 ft and under	69.00 to 70.00
Rails 18 in. and under	70.00 to 71.00
Railroad grate bars	35.00 to 36.00
Steel axle turnings	33.00 to 34.00
Railroad cast.	53.00 to 54.00
No. 1 machinery cast	52.00 to 53.00
Stove plate	49.00 to 50.00
Malleable	57.00 to 58.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$49.00 to \$50.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	49.00 to 50.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	28.00 to 29.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. plate	50.00 to 51.00

Buffalo

No. 1 hvy. melting	\$49.00 to \$50.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	27.00 to 28.00
Bar crops and plate	54.00 to 55.00
Structural and plate, 2 ft.	53.00 to 54.00
No. 1 RR. hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	58.00 to 59.00
Rails, 18 in. and under	61.00 to 62.00
Angles & splice bars	59.00 to 60.00
Rerolling rails	62.00 to 63.00
No. 1 cupola cast	50.00 to 51.00
Stove plate	50.00 to 51.00
Charging box cast	40.00 to 41.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	41.00 to 42.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	48.00 to 49.00

Detroit

No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	31.50 to 32.50
Low phos. 18 in. & under	54.00 to 55.00
Rails, random lengths	58.00 to 59.00
Rails, 18 in. and under	67.00 to 68.00
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Drop broken cast	56.00 to 57.00

St. Louis

No. 1 hvy. melting	\$47.00 to \$48.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	32.50 to 33.50
Mixed bor. and turn.	31.50 to 32.50
Shoveling turnings	35.00 to 36.00
Cast iron borings	31.50 to 32.50
Low phos. 18 in. & under	54.00 to 55.00
Rails, random lengths	58.00 to 59.00
Rails, 18 in. and under	63.00 to 64.00
Locomotive tires uncut	51.00 to 52.00
Angles and splice bars	55.00 to 56.00
Std. steel car axles	73.00 to 74.00
RR. specialties	56.00 to 57.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	40.00 to 41.00
Cast iron brake shoes	49.00 to 50.00
Stove plate	41.00 to 42.00
Cast iron car wheels	47.00 to 48.00
Rerolling rails	63.00 to 64.00
Unstripped motor blocks	40.00 to 41.00

Boston

No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	33.00 to 34.00
No. 1 RR. hvy. melting	52.00 to 53.00
Rails, random lengths	55.00 to 56.00
Rails, 18 in. and under	63.00 to 64.00
Locomotive tires uncut	51.00 to 52.00
Angles and splice bars	55.00 to 56.00
Std. steel car axles	73.00 to 74.00
RR. specialties	56.00 to 57.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	40.00 to 41.00
Cast iron brake shoes	49.00 to 50.00
Stove plate	41.00 to 42.00
Cast iron car wheels	47.00 to 48.00
Rerolling rails	63.00 to 64.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$47.50 to \$48.00
No. 2 hvy. melting	38.50 to 39.50
No. 2 dealer bundles	37.00 to 38.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Clean cast. chem. borings	31.00 to 32.00
No. 1 machinery cast	48.00 to 49.00
Cupola cast	45.00 to 46.00
Unstripped motor blocks	36.50 to 37.50

Birmingham

No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	31.50 to 32.50
Elec. furnace, 2 ft & under	48.00 to 49.00
Angles & splice bars	53.00 to 54.00
Rerolling rails	62.00 to 63.00
No. 1 cupola cast	50.00 to 51.00
Stove plate	50.00 to 51.00
Charging box cast	40.00 to 41.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	41.00 to 42.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	32.50 to 33.50
Mixed bor. and turn.	31.50 to 32.50
Shoveling turnings	35.00 to 36.00
Cast iron borings	31.50 to 32.50
No. 1 cupola cast	46.00 to 47.00
Stove plate	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Drop broken cast	56.00 to 57.00

San Francisco

No. 1 hvy. melting	\$55.00
No. 2 hvy. melting	50.00
No. 1 dealer bundles	54.00
No. 2 bundles	38.00
Machine shop turn.	35.00

Cast iron borings	35.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast	57.00

Los Angeles

No. 1 hvy. melting	\$55.00
No. 2 hvy. melting	51.00
No. 1 dealer bundles	54.00
No. 2 bundles	36.00
Machine shop turn.	35.00

Shoveling turnings	37.00

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Copper Makers Cool To Stockpiling

For strategic reasons fine, but most copper producers oppose stockpiling as a means of market support.

Suggested revision of government buying policy receives mixed reaction.

■ The prospect of renewed government stockpiling of copper is getting a cool reception from the copper industry.

"We have no objection to the government taking what it needs for strategic purposes. But we don't want government market support. It is not healthy in the long run." This is what a representative of one of the "big 3" producers had to say. It is typical of producer thinking.

No Need—Another went a little further. He disclaims the need for a stabilizing factor because he feels the market will soon correct itself. He says: If the government wants copper to be used in case of emergency it should revise its buying policy. Right now, he goes on, the government stockpile is pretty well restricted to basic copper ingots. He believes it should include important mill products.

Brass mills are divided on this point. One major mill calls this idea "wise," suggests government buy wire bars and standard shapes. The reason: remelting, alloying, and shaping will be a bottleneck in an emergency.

Another mill says changing alloy specifications makes this unfeasible. It reports rapid technical progress is forcing the government to constantly alter its alloy requirements.

The mill believes this "groping" will not settle in the immediate future. Stockpiling beyond basic metal could result in a stock of obsolete and unusable items.

Advise Caution—In general, brass mills agree with producers. Says one, "If the government feels it should have more stockpile copper, now is the perfect time." However, it urges extreme caution. Fear is that too much government buying could start the copper price moving up again.

One mill believes the government would not support a 32¢ copper market, considers it possible at 30¢. A sales executive in this mill says most of his customers are looking for 30¢ copper, and staying out of the market meanwhile. If the price holds at 32¢ per lb for a couple of weeks more, they will probably start buying, removing any need for support, he says.

Actual price isn't the key factor, according to the same mill. A lower price can mean more business, it admits, but a declining market means almost no business. Customers hold off, waiting for the bottom to be reached.

Other Factors—Another mill takes the long range view. "If enough copper is available to the government from the stockpile in case of an emergency, it will mean little or no shortage of metal available to us."

"Floor price" contracts between the government and some producers are not likely to be a factor in restarting a stockpiling program. These agreements were made, in 1954, to encourage expansion. The government promised to buy spe-

cific quantities of copper from specific projects if the market price dropped below "floor" levels. Price is based on specific cost plus profit.

Should the price of copper fall to 30¢ the government would receive copper from a few sources. But tonnage would be small. Floor price in the largest contracts are between 22¢ and 27¢ per lb.

ALUMINUM—Major aluminum companies insist the reduction in price of soft alloy extruded shapes is not a harbinger of an across-the-board cut.

Extrusions affected are now five to six pct cheaper. Net price for 6063-T5 alloy, one of the most popular, now ranges between 42¢ and 50¢ per lb.

Tin prices for the week: Feb. 26—98.375; Feb. 27—98.25; Feb. 28—98.25; Mar. 1—98.50; Mar. 4—99.00; Mar. 5—99.00.*

*Estimate

Primary Prices

(cents per lb)	Current price	Last price	Date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	32.00	34.00	2/18/57
Copper (CS)	31.00	32.00	2/20/57
Copper (L)	32.00	34.00	2/19/57
Lead, St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250-275	270-300	12/4/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.80	1/6/56

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see column at right, other primary prices, pg. 184.

Monthly Average Metal Prices

(Cents per lb except as noted)
Average prices of the major nonferrous metals in February based on quotations appearing in THE IRON AGE, were as follows.

Electrolytic copper, del'd	
Conn. Valley	33.136
Copper, Lake	33.181
Straits Tin, New York	101.063
Zinc, E. St. Louis	13.50
Lead, St. Louis	15.80
Aluminum ingot, frt allow'd	27.10

Note: Quotations are going prices.



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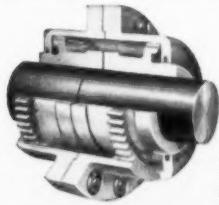
Canada's commercial fertilizer output received a big boost recently, thanks to Northwest Nitro-Chemical, Ltd.'s. new plant built at Medicine Hat, Alberta by the Fluor Corporation of Canada, Ltd. Because of top engineering, design and fabrication

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The **IRON AGE**

NONFERROUS PRICES

(Effective March 5, 1957)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)					
Flat Sheet (Mill Finish) and Plate ("F" temper except 6061-0)					
Alloy	.032	.081	.136	.250	.3
1800, 1100, 3003.....	44.3	42.1	40.9	40.2	
5052.....	51.8	46.8	45.1	42.9	
6061-0.....	48.9	44.6	42.8	42.6	

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8.....	42.7-44.4	57.6-61.1
12-14.....	43.4-44.8	58.4-62.7
24-26.....	46.4-46.9	68.7-73.1
36-38.....	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size"	1/4	5/16-5/8	3/4-1	1 1/4-1 1/2
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length" →	72	96	120	144
.019 gage.....	\$1.352	\$1.803	\$2.254	\$2.704
.024 gage.....	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type →	Gage →	250-	250-	.081	.032
AZ31B Stand, Grade.....		67.9	69.0	77.9	103.1
AZ31B Spec.....		93.3	95.7	108.7	171.3
Tread Plate.....		70.6	71.7		
Tooling Plate.....	72.0				

Extruded Shapes

factor →	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C).....	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B).....	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

"A" Nickel	Monel	Inconel	
Sheet, CR.....	126	106	128
Strip, CR.....	124	108	138
Rod, bar, HR.....	107	89	109
Angles, HR.....	107	89	109
Plates, HR.....	120	105	121
Seamless tube.....	157	129	200
Shot, blocks.....	87	...	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs.)

	Sheet	Wire	Rod	Tube
Copper.....	54.13	.....	51.36	54.32
Brass, 70/30.....	47.52	48.06	47.46	50.43
Brass, Low.....	50.20	50.74	50.14	53.01
Brass, R.L.....	51.14	51.68	51.08	53.95
Brass, Naval.....	51.69	.....	46.00	55.10
Muntz Metal.....	49.79	.....	45.60	.....
Comm. Bz.....	52.63	53.17	52.57	55.19
Mang. Bz.....	55.43	.....	49.53	.....
Phos. Bz, 5%.....	73.17	.....	73.67	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$11.00-\$12.10; alloy, \$14.75; Plate, HR, commercially pure, \$9.25-\$9.75; alloy, \$11.26. Write, rolled and/or drawn, commercially pure, \$8.50-\$9.00; alloy, \$11.00; Bar, HR or forged, commercially pure, \$7.10-\$7.35; alloy, \$7.10-\$7.80; billets, HR, commercially pure, \$6.85-\$7.10; alloy, \$6.85-\$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex.....	33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be.....	\$74.75
Beryllium copper, per lb conta'd Be, \$43.00	
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading.....	\$71.50
Bismuth, ton lots.....	\$2.25
Cadmium, de'd.....	\$1.70
Calcium, 99.9%, small lots.....	\$4.55
Chromium, 99.8% metallic balls.....	\$1.31
Cobalt, 97-99% (per lb).....	\$2.00 to \$2.07
Germanium, per gm, f.o.b. Miami, Okla., refined.....	\$48.50-\$53.50
Gold, U. S. Treas., per troy oz.....	\$36.00
Indium, 99.9% dollars per troy oz.....	\$2.85
Iridium, dollars per troy oz.....	\$90 to \$100
Lithium, 98%.....	\$11.00 to \$14.00
Magnesium, sticks, 100 to 500 lb.....	59.00
Mercury, dollars per 76-lb flask, f.o.b. New York.....	\$255 to \$257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel.....	71.25
Palladium, dollars per troy oz.....	\$23 to \$24
Platinum, dollars per troy oz.....	\$92 to \$95
Rhodium.....	\$120.00 to \$125.00
Silver ingots (per troy oz).....	\$1.375
Thorium, per kg.....	\$43.00
Uranium, normal per kg.....	\$40.00
Vanadium.....	\$3.45
Zirconium sponge.....	\$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 Ingot.....	31.50
No. 115.....	30.00
No. 120.....	28.50
No. 123.....	35.50
80-10-10 Ingot.....	33.50
No. 305.....	33.50
No. 315.....	43.25
88-10-2 Ingot.....	40.00
No. 210.....	35.50
No. 215.....	40.00
No. 245.....	25.25
No. 405.....	28.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys.....	24.50-25.50
0.30 copper max.....	24.25-25.25
0.60 copper max.....	24.25-24.75
Piston alloys (No. 122 type).....	23.75-24.75
No. 12 alum. (No. 2 grade).....	22.00-23.00
108 alloy.....	22.00-23.00
195 alloy.....	24.00-25.75
13 alloy (0.60 copper max).....	24.25-25.25
AXS-679.....	22.00-23.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	22.75-23.75
Grade 2—92-95%	21.25-22.00
Grade 3—90-92%	20.50-21.50
Grade 4—85-90%	19.75-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

Heavy Turnings	
Copper.....	28
Yellow brass.....	21%
Red brass.....	25
Comm. bronze.....	25%
Mang. bronze.....	20%
Yellow brass rods ends.....	21%

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	26 1/2
No. 2 copper wire.....	25
Light copper.....	22 1/2
No. 1 composition.....	23
No. 1 comp turnings.....	22 1/2
Hvy. yellow brass solids.....	17 1/2
Brass Pipe.....	19 1/2
Radiators.....	17 1/2

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

Copper and Brass	
No 1 copper wire.....	23 1/2—24
No. 2 copper wire.....	22—22 1/2
Light copper.....	20—20 1/2
Auto radiators (unsweated).....	15—15 1/2
No. 1 composition.....	20 1/2—21
No. 1 composition turnings.....	20—20 1/2
Cocks and faucets.....	16
Clean heavy yellow brass.....	14—14 1/2
Brass pipe.....	16 1/2—17
New soft brass clippings.....	18 1/2—19
No. 1 brass rod turnings.....	15 1/2—16

Nickel and Monel

Pure nickel clippings..... \$1.65-\$1.75

Pure nickel clippings.....	\$1.65-\$1.75
Clean nickel turnings.....	\$1.40-\$1.50
Nickel anodes.....	\$1.65-\$1.75
Nickel rod ends.....	\$1.65-\$1.75
New Monel clippings.....	78-80
Clean Monel turnings.....	68
Old sheet Monel.....	73-75
Nickel silver clippings, mixed.....	21
Nickel silver turnings, mixed.....	18

Miscellaneous

Block tin..... 75—76

No. 1 pewter.....	59—60
Auto babbitt.....	39—40
Mixed common babbitt.....	12—12 1/2
Solder joints.....	17 1/2—18
Siphon tops.....	42
Small foundry type.....	14 1/4—14 1/2
Monotype.....	14—14 1/2
Lino. and stereotype.....	13—13 1/2
Electrotype.....	12 1/2—12 3/4
Hand picked type shells.....	9 1/2—10
Lino. and stereo. dross.....	4 1/2—5
Electro. dross.....	4—4 1/2

IRON AGE		<i>Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.</i>													
STEEL PRICES <i>(Effective March 5, 1957)</i>		BILLETS, BLOOMS, SLABS				PIL-ING	SHAPES STRUCTURALS				STRIP				
EAST	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled		
	Bethlehem, Pa.		\$107.00 B3		5.05 B3	7.40 B3	5.05 B3								
	Buffalo, N. Y.	\$74.00 B3, R3	\$91.50 B3, R3	\$107.00 B3, R3	5.90 B3	5.05 B3	7.40 B3	5.05 B3	4.675 B3, R3	6.85 R7	6.95 B3				
	Claymont, Del.														14.55 C11
	Harrison, N. J.														
	Conshohocken, Pa.		\$96.50 A2	\$114.00 A2						4.725 A2	6.90 A2	6.95 A2			
	New Bedford, Mass.										7.30 R6				
	Johnstown, Pa.	\$74.00 B3	\$91.50 B3	\$107.00 B3		5.05 B3	7.40 B3								
	Boston, Mass.										7.40 T8				14.90 T8
	New Haven, Conn.										7.30 D1				
MIDDLE WEST	Baltimore, Md.										6.85 T8				
	Phoenixville, Pa.					5.85 P2		5.85 P2							
	Sparrows Pt., Md.									4.675 B3		6.95 B3			
	Bridgeport, Wallingford, Conn.	\$79.00 N8	\$96.50 N8	\$107.00 N8							7.30 W1 6.95 N8				
	Pawtucket, R. I.										7.48 A5,N7				14.90 N7
	Worcester, Mass.														
	Alton, Ill.									4.875 L1					
	Ashland, Ky.									4.675 A7					
	Canton-Massillon, Dover, Ohio		\$94.00 R3	\$107.00 R3, T3						6.85 G4		10.10 G4			14.55 G4
	Chicago, Ill. Franklin Park, Ill.	\$74.00 U1, R3	\$91.50 U1, R3,W8	\$107.00 U1, R3,W8	5.90 U1	5.00 U1,W8 5.50 P13	7.35 U1,Y1 6.00 W8	5.00 U1	4.675 N4 4.675 A1	6.95 41,T8					7.75 W8, S9 14.55 A1, S9,T8
WEST	Cleveland, Ohio										6.85 A5,J3				7.75 J3
	Detroit, Mich.					\$107.00 R5				4.775 G3, M2	6.95 M2,G3, D2,P11	7.05 G3	10.10 G3, D2	7.75 G3	
	Anderson, Ind.										6.85 G4		10.10 G4		
	Duluth, Minn.														
	Gary, Ind. Harbor, Indiana	\$74.00 U1	\$91.50 U1	\$107.00 U1, Y1	5.90 I3	5.00 U1	7.35 U1,I3	5.25 I3	4.675 U1, I3,Y1	6.85 Y1	6.95 U1, I3,Y1	10.20 Y1	7.75 U1, Y1		
	Sterling, Ill.	\$74.00 N4								4.775 N4		7.00 C5			
	Indianapolis, Ind.														7.75 A9
	Newport, Ky.														
	Middletown, Ohio														
	Niles, Warren, Ohio Sharon, Pa.		\$91.50 SI, C10	\$107.00 SI, C10					4.675 SI, R3	6.85 T4	6.95 SI, R3	10.00 SI, R3	7.75 SI	14.55 SI	
SOUTH	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$74.00 U1	\$91.50 U1, C11	\$107.00 U1, C11	5.90 U1	5.00 U1, J3	7.35 U1, J3	5.00 U1	4.675 P6	5.750 P6 6.85 J3,B4, S7					7.75 S9 14.55 S9
	Portsmouth, Ohio														
	Weirton, Wheeling, Follansbee, W. Va.					5.00 W3				4.675 W3	6.85 W3,F3	6.95 W3	9.65 W3		
	Youngstown, Ohio	\$74.00 R3	\$91.50 Y1, C10	\$107.00 Y1				7.35 Y1		4.675 UI, Y1	6.85 Y1,C5	6.95 UI, Y1	10.20 Y1	7.75 UI, Y1	
	Fontana, Cal.	\$83.50 K1	\$101.00 K1	\$128.00 K1		5.75 K1	8.10 K1	5.90 K1	5.525 K1	8.70 K1					
	Geneva, Utah		\$91.50 C7			5.00 C7	7.35 C7								
	Kansas City, Mo.					5.10 S2	7.45 S2			4.925 S2		7.20 S2			
	Los Angeles, Torrance, Cal.		\$101.00 B2	\$127.00 B2		5.70 C7, B2	8.05 B2			5.425 B2, C7	8.90 C1				8.95 B2
SOUTH	Minnequa, Colo.					5.30 C6				5.775 C6					
	Portland, Ore.					5.75 O2									
	San Francisco, Niles, Pittsburg, Cal.					5.65 B2	8.00 B2			5.425 C7,B2					
	Seattle, Wash.					5.75 B2	8.10 B2			5.675 B2					
SOUTH	Atlanta, Ga.									4.875 A8					
	Fairfield, Ala. City, Birmingham, Ala.	\$74.00 T2	\$91.50 T2			5.00 T2,R3 5.25 C16	7.35 T2			4.675 T2,R3 4.975 C10 4.925 C16		6.95 T2			
	Houston, Lone Star, Texas	\$80.00 L3	\$96.50 S2	\$112.00 S2		5.10 S2	7.45 S2			4.925 S2		7.20 S2			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

(Effective March 5, 1957)

	SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box		
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 <i>B3</i>	5.75 <i>B3</i>				6.90 <i>B3</i>	8.525 <i>B3</i>		5.80 <i>W6</i>	† Special coated mig- teme deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct \$2.20 from 1.25-lb. coke base box.			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 <i>A2</i>	5.80 <i>A2</i>				6.95 <i>A2</i>							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.													
	Fairless, Pa.	4.725 <i>U1</i>	5.80 <i>U1</i>				6.95 <i>U1</i>	8.575 <i>U1</i>		5.80 <i>B3</i>	\$9.80 <i>U1</i>	\$8.50 <i>U1</i>		
	New Haven, Conn.													
MIDDLE WEST	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 <i>B3</i>	5.75 <i>B3</i>	6.30 <i>B3</i>			6.90 <i>B3</i>	8.575 <i>B3</i>	9.275 <i>B3</i>	5.90 <i>B3</i>	\$9.90 <i>B3</i>	\$8.50 <i>B3</i>		
	Worcester, Mass.										6.10 <i>A5</i>			
	Trenton, N. J.													
	Alton, Ill.										6.00 <i>L1</i>			
	Ashland, Ky.	4.675 <i>A7</i>		6.30 <i>A7</i>	6.325 <i>A7</i>									
	Canton-Massillon, Dover, Ohio			6.30 <i>R3,R1</i>										
	Chicago, Joliet, Ill.	4.675 <i>W8, A1</i>					6.90 <i>U1</i>			5.80 <i>K2</i>	5.80 <i>A5,R3, N4,W8,K2</i>			
	Sterling, Ill.										5.90 <i>N4,K2</i>			
	Cleveland, Ohio	4.675 <i>J3, R3</i>	5.75 <i>J3, R3</i>		6.325 <i>R3</i>		6.90 <i>R3</i>	8.525 <i>R3, J3</i>			5.80 <i>A5</i>			
WEST	Detroit, Mich.	4.775 <i>G3, M2</i>	5.85 <i>G3, M2</i>				7.00 <i>G2</i>	8.625 <i>G3</i>						
	Newport, Ky.	4.675 <i>A9</i>	5.75 <i>A9</i>											
	Gary, Ind. Harbor, Indiana	4.675 <i>U1, I3,Y1</i>	5.75 <i>U1, I3,Y1</i>	6.30 <i>U1, I3</i>	6.325 <i>U1, I3,Y1</i>	6.70 <i>U1</i>	6.90 <i>U1, Y1,I3</i>	8.525 <i>U1, Y1</i>		5.80 <i>Y1</i>	\$9.70 <i>U1, Y1</i>	\$8.40 <i>I3, U1,Y1</i>	7.15 <i>U1, Y1</i>	
	Granite City, Ill.	4.875 <i>G2</i>	5.95 <i>G2</i>	6.50 <i>G2</i>	6.525 <i>G2</i>							\$8.50 <i>G2</i>	7.25 <i>G2</i>	
	Kokomo, Ind.			6.40 <i>C9</i>						5.90 <i>C9</i>				
	Mansfield, Ohio		5.75 <i>E2</i>			6.70 <i>E2</i>								
	Middletown, Ohio		5.75 <i>A7</i>	6.30 <i>A7</i>	6.325 <i>A7</i>	6.70 <i>A7</i>								
	Niles, Warren, Ohio Sharon, Pa.	4.675 <i>S1, R3,N3</i>	5.75 <i>R3</i>	6.30 <i>R3</i>	6.325 <i>N3</i>	6.70 <i>N3</i>	6.90 <i>S1, R3</i>	8.525 <i>S1, R3</i>				\$8.40 <i>R3</i>		
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 <i>U1, J3,P6</i>	5.75 <i>U1, J3,P6</i>	6.30 <i>U1, J3</i>	6.325 <i>U1</i>		6.90 <i>U1, J3,R3</i>	8.525 <i>U1, J3</i>	9.275 <i>U1</i>	5.80 <i>A5, P6,J3</i>	\$9.70 <i>J3, U1</i>	\$8.40 <i>U1, J3</i>	7.15 <i>U1, J3</i>	
	Portsmouth, Ohio	4.675 <i>P7</i>	5.75 <i>P7</i>							5.80 <i>P7</i>				
SOUTH	Weirton, Wheeling, Follansbee, W. Va.	4.675 <i>W3, W5</i>	5.75 <i>W3, W5,F3</i>	6.30 <i>W3, W5</i>		6.70 <i>W3, W5</i>	6.90 <i>W3</i>	8.525 <i>W3</i>			\$3.70 <i>W3, W5</i>	\$8.40 <i>W3, W5</i>	7.15 <i>W3 7.40 W3</i>	
	Youngstown, Ohio	4.675 <i>U1, Y1</i>	5.75 <i>Y1</i>		6.325 <i>Y1</i>		6.90 <i>Y1</i>	8.525 <i>Y1</i>		5.80 <i>Y1</i>			7.15 <i>Y1</i>	
	Fontana, Cal.	5.525 <i>K1</i>	7.00 <i>K1</i>				7.75 <i>K1</i>	9.175 <i>K1</i>				\$10.45 <i>K1</i>	\$9.15 <i>K1</i>	
	Geneva, Utah	4.775 <i>C7</i>												
	Kansas City, Mo.										6.05 <i>S2</i>			
WEST	Los Angeles, Torrance, Cal.										6.60 <i>B2</i>			
	Minnequa, Colo.										6.05 <i>C6</i>			
	San Francisco, Niles, Pittsburg, Cal.	5.375 <i>C7</i>	6.70 <i>C7</i>	7.05 <i>C7</i>						6.60 <i>C7</i>	\$10.45 <i>C7</i>	\$9.15 <i>C7</i>		
	Seattle, Wash.													
	Atlanta, Ga.													
SOUTH	Fairfield, Ala. Alabama City, Ala.	4.675 <i>T2, R3</i>	5.75 <i>T2</i>	6.30 <i>T2, R3</i>						5.80 <i>T2,R3</i>	\$9.80 <i>T2</i>	\$8.50 <i>T2</i>		
	Houston, Tex.										6.05 <i>S2</i>			

IRON AGE STEEL PRICES		<i>Italics</i> identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
EAST	(Effective March 5, 1957)	BARS						PLATES			WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	
Bethlehem, Pa.					6.125 B3	8.325 B3	7.40 B3					
Buffalo, N. Y.	5.075 B3,R3	5.075 B3,R3	6.90 B3		6.125 B3,R3	8.325 B3,B3	7.40 B3	4.35 B3			7.20 W6	
Claymont, Del.												
Coatesville, Pa.												
Conshohocken, Pa.												
Harrisburg, Pa.												
Hartford, Conn.												
Johnstown, Pa.	5.075 B3	5.075 B3			6.125 B3			4.85 B3		6.85 B3	7.25 B3	
Fairless, Pa.	5.225 U1	5.225 U1				6.275 U1						
Newark, N. J.					7.30 W10		8.50 W10					
Camden, N. J.					7.30 P10		8.50 P10					
Bridgeport, Conn. Putnam, Conn.	5.30 N8	5.30 N8			7.20 N8	8.475 N8	7.50 N8					
Sparrow Pt., Md.								4.85 B3		6.85 B3	6.85 B3	
Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 M7	5.225 M7			7.40 B5,C14						7.50 A5,W6	
Spring City, Pa.					7.30 K4		8.50 K4				9.025 T8	
Alton, Ill.	5.275 L1										7.40 L1	
Ashland, Newport, Ky.												
Canton, Massillon, Ohio					6.85 R3,R2	6.125 R3,T3	8.325 R3,R2, T3					
Chicago, Joliet, Ill.	5.075 U1,R3, W8,N4 5.575 P13	5.075 U1,R3, N4 5.575 P13			6.85 A5,B5, W10,L2 W8,N9	6.125 U1,R3, W8	5.875 W8 7.425 U1	4.85 U1,I3, W8,A1	5.925 U1	6.85 U1,W8	7.25 U1	7.20 A5,K2 R3,N4,W7
Cleveland, Ohio	5.075 R3	5.075 R3			6.85 A5,C13		8.325 A5,C13	7.425 R3	4.95 J3,R3	5.925 J3		7.25 J3,R3
Detroit, Mich.	5.175 G3	5.425 G3			7.05 B5,P8 7.10 P3 6.85 R5	6.225 G3	8.525 B5,P3, PR	7.525 G3	4.95 G3		6.90 G3	
Duluth, Minn.												7.20 A5
Gary, Ind. Harbor, Crawfordsville	5.075 U1,I3, Y1	5.075 U1,I3, Y1			6.85 R3,M5	6.125 U1,I3, Y1	8.325 R3,M4	7.425 U1,I3, Y1	4.85 U1,I3, Y1	5.925 I3	6.85 U1,Y1	7.25 U1,Y1
Granite City, Ill.									5.05 G2			
Kokomo, Ind.												7.30 C9
Sterling, Ill.	5.175 N4	5.175 N4										7.30 K2
Niles, Warren, Ohio Sharon, Pa.					6.85 C10	6.125 C10,S1	8.325 C10	7.425 S1	4.85 S1,R3		6.85 S1	7.25 S1,R3
Pittsburgh, Pa. Midland, Pa.	5.075 U1, C11,J3	5.075 U1,J3			6.85 A5,C8, J5,R3,S9 B4,W10,C11	6.125 U1, C11,J3	8.325 A5,R3, SW,C8,W10, C11	7.425 U1,J3	4.85 U1,J3	5.925 U1	6.85 U1,J3	7.25 U1,J3, P6
Portsmouth, Ohio												7.20 P7
Weirton, Wheeling, Follansbee, W. Va.									4.85 W5			
Youngstown, Ohio	5.075 U1, Y1,R3	5.075 U1, Y1,R3	6.85 U1,Y1, F2	6.125 U1,Y1	8.325 Y1,F2	7.425 U1,Y1	4.85 U1,Y1, R3		6.85 Y1	7.25 Y1 7.25 U1	7.20 Y1	
Emeryville, Cal.	5.825 J5	5.825 J5										
Fontana, Cal.	5.775 K1	5.775 K1										
Geneva, Utah	5.175 C7											
Kansas City, Mo.	5.325 S2	5.325 S2										7.45 S2
Los Angeles, Terrance, Cal.	5.775 C7,B2	5.775 C7,B2			6.375 S2			7.675 S2				8.15 B2
Minnequa, Colo.	5.525 C6	5.525 C6										7.45 C6
Portland, Ore.	5.825 O2	5.825 O2										
San Francisco, Niles, Pittsburg, Cal.	5.775 C7 5.825 B2 6.025 P9	5.775 C7 5.825 B2 6.025 P9						8.175 B2				8.15 C7,C6
Seattle, Wash.	5.825 B2 N6	5.825 B2						8.175 B2	5.75 B2		7.75 B2	8.15 B2
Atlanta, Ga.	5.575 A8											7.40 A8
Fairfield, Ala. City, Birmingham, Ala.	5.075 T2,R3 5.325 C16	5.075 T2,R3 5.325 C16						7.425 T2	4.85 T2,R3		7.25 T2	7.20 T2,R3
Houston, Ft. Worth, Long Star, Tex.	5.325 S2	5.325 S2			6.375 S2			7.675 S2	4.95 S2 5.20 L3		6.95 S2	7.35 S2

† Merchant Quality—Specialty Quality .35¢ higher.

STEEL PRICES

(Effective March 5, 1957)

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme Newport Steel Co., Newport, Ky.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Pacific Coast Steel Corp., San Francisco
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Broad Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C3	Central Iron & Steel Co., Harrisburg, Pa.
C4	Claymont Products Dept., Claymont, Del.
C5	Cold Metals Products Co., Youngstown, O.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafing Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperfield Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C12	Cumberland Steel Co., Cumberland, Md.
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson Co., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C17	Chester Blast Furnace, Inc., Chester, Pa.
D1	Detroit Steel Corp., Detroit
D2	Dearborn Div., Sharon Steel Corp.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire Steel Co., Mansfield, O.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown

F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Green Steel Co., Dover, O.
H1	Hanna Furnace Corp., Detroit
I2	Ingersoll Steel Div., Chicago
I3	Inland Steel Co., Chicago
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Cal.
K2	Keystone Steel & Wire Co., Peoria
K3	Koppers Co., Granite City, Ill.
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mig. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M5	Monarch Steel Div., Hammond, Ind.
M6	Mystic Iron Works, Everett, Mass.
M7	Milton Steel Products Div., Milton, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N3	Niles Rolling Mill Div., Niles, O.
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Northeastern Steel Corp., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Iron & Steel Co., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P5	Pittsburgh Screw & Bolt Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
R1	Reeves Steel & Mfg. Co., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Rotary Electric Steel Co., Detroit
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon, Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S6	Standard Forging Corp., Chicago
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Corp., Carnegie, Pa.
S10	Seneca Steel Service, Buffalo
T1	Tonawanda Iron Div., Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (per cent) f.o.b. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD												SEAMLESS											
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.			
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. B3	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50	...	...	...	...	...	...	...	...	...	...
Youngstown R3	9.25	+10.00	12.25	+6.00	15.75	-1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50	...	...	...	...	...	...	...	...	...	...
Fontana K1	+3.75	23.00	0.75	+19.00	2.75	-14 ¹ ₂	5.25	+12 ¹ ₂	5.75	+11 ³ ₄	6.25	+11.25	7.75	+10.50	...	...	...	...	...	...	...	...	...	...
Pittsburgh J3	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50	...	...
Alton, Ill. L1	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50	...	...	...	...	...	...	...	...	...	...
Sharon M3	9.25	+10.00	12.25	+2.00	15.75	-1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50	...	...	...	...	...	...	...	...	...	...
Fairless N2	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50	...	...	...	...	...	...	...	...	...	...
Pittsburgh N1	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50	...	...
Wheeling W5	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	...	...	...	...	...	...	...	...	...	...
Wheeland W4	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	...	...	...	...	...	...	...	...	...	...
Youngstown Y1	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50	...	...
Indiana Harbor Y1	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.25	4.25	...	...	...	...	...	...	...	...	...	...
Lorain N2	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50	...	...
EXTRA STRONG PLAIN ENDS	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50	...	...	...	...	...	...	...	...	...	...
Sparrows Pt. B3	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50	...	...	...	...	...	...	...	...	...	...
Youngstown R3	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50	...	...	...	...	...	...	...	...	...	...
Fairless N2	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50	...	...	...	...	...	...	...	...	...	...
Fontana K1	0.75	4.75	7.75	8.25	8.75	9.25	9.75	10.25	10.75	11.25	11.75	12.25	12.75	13.25	...	...	...	...	...	...	...	...	...	...
Pittsburgh J3	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50	...	...
Alton, Ill. L1	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50	...	...	...	...	...	...	...	...	...	...
Sharon M3	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50	...	...	...	...	...	...	...	...	...	...
Pittsburgh N1	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50	...	...
Wheeling W5	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	...	...	...	...	...	...	...	...	...	...
Wheeland W4	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	...	...	...	...	...	...	...	...	...	...
Youngstown Y1	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50	...	...
Indiana Harbor Y1	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50	...	...	...	...	...	...	...	...	...	...
Lorain N2	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50	...	...

Threads only, buttweld and seamless 2 1/4 pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5 1/2 pt. higher discount.
 Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 2 1/2 pt.; 2-in. and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

(Effective March 5, 1957)

To identify producers, see Key on preceding page

TOOL STEEL

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	\$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	1	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	2.5	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2
High-carbon chromium..		.83	D-3, D-5			
Oil hardened manganese.		.45	O-5			
Special carbon .....		.41	W-1			
Extra carbon .....		.345	W-1			
Regular carbon .....		.29	W-1			
Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.						

CLAD STEEL

Base prices, cents per lb f.o.b.

Sales Type	Plate (A3, J2, L6)			Sheet (J2)		
	Cladding			Sheet		
	10 pct	15 pct	20 pct	20 pct		
302.....					35.50	
304.....	34.60	38.00	41.50		37.75	
316.....	39.70	43.20	46.65		55.50	
321.....	36.35	39.80	43.50		44.75	
347.....	39.50	43.95	48.45		54.25	
405.....	29.20	33.15	37.05			
410, 430.....	28.70	32.65	36.55			
C-R Strip (S9) Copper, 10 pct, 2 sides, 39.85; 1 side, 33.00.						

WARE-HOUSES

Cities	City Delivers [†] Charge	Sheets		Strip	Plates	Shapes	Bars		Alloy Bars				Metropolitan Price, dollars per 100 lb.					
		Hot-Rolled (18 gage & hrw.)	Cold-Rolled (15 gage)				Hot-Rolled (merchant)	Hot-Rolled (special quality)	Cold- Finished	Hot-Rolled As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed	Hot-Rolled 4140 Annealed	Hot-Rolled 4140 Annealed	Hot-Rolled 4140 Annealed	Hot-Rolled 4140 Annealed	
Atlanta.....	8.17	9.37	9.83	8.21	8.55	8.59	8.45	—	10.23									
Baltimore.....	\$1.10	7.79	8.99	9.12	8.27	8.12	8.57	8.34	9.69	14.99	14.44	18.39	18.09					
Birmingham.....	15	7.68	8.88	9.52	7.78	8.01	8.05	8.07	8.44	10.04								
Boston.....	10	8.94	9.83	11.16	8.89	9.28	9.20	9.17	9.57	10.71	15.79	14.79	19.14	18.39				
Buffalo.....	15	8.00	9.15	10.90	8.20	9.65	8.40	8.85	8.85	15.65	14.50	19.01	18.10					
Chicago.....	15	7.80	9.00	9.85	7.82	8.16	8.20	8.22	8.44	8.50	15.30	14.10	18.65	17.75				
Cincinnati.....	15	8.09	9.20	9.90	8.29	8.67	8.89	8.53	8.87	8.99	15.61	14.38	18.96	18.03				
Cleveland.....	15	7.93	9.13	9.75	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.83				
Denver.....	9.55	11.09	12.41	9.70	9.80	9.60	9.75	—	10.54					19.79				
Detroit.....	15	8.18	9.40	10.20	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16				
Houston.....		8.80	9.75	—	8.85	8.80	9.10	9.00	—	10.65	15.50	—	19.30	19.05				
Kansas City.....	20	8.52	9.72	10.07	8.60	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42					
Los Angeles.....	10	9.00	10.75	11.75	9.20	9.45	9.05	9.15	9.60	11.80	15.85	15.35	19.70	19.45				
Memphis.....	15	8.62	9.22	—	8.12	8.35	8.39	8.25	—	9.85								
Milwaukee.....	15	8.08	9.28	9.97	8.10	9.75	9.25	8.35	8.71	8.72	15.43	14.22	18.78	17.87				
New York.....	10	8.55	9.76	10.33	9.00	9.11	9.01	9.11	9.48	10.75	15.02	14.49	18.42	18.14				
Norfolk.....	20	8.00	—	—	8.40	8.35	8.70	8.45	—	10.70								
Philadelphia.....	10	8.25	9.17	10.22	8.68	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21				
Pittsburgh.....	15	7.93	9.14	10.20	7.88	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90				
Portland.....		8.90	9.65	11.40	10.25	9.60	9.35	9.45	—	13.55	16.70	16.10	20.40	20.25				
San Francisco.....	10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.45	12.40	15.85	15.35	19.70	19.45				
Seattle.....		9.35	10.45	11.55	9.50	9.30	9.15	9.30	9.85	13.15	16.55	15.55	19.50	19.20				
Spokane.....	15	9.50	10.60	11.80	9.70	9.20	9.30	9.65	10.00	13.30	—	16.55	—	20.10				
St. Louis.....	15	8.54	9.74	10.21	8.34	8.67	8.82	8.58	8.96	9.08	15.66	14.43	19.01	18.08				
St. Paul.....	15	8.29	9.64	10.31	8.39	8.71	8.75	8.52	—	9.21	14.62	—	18.27					

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1998 lb. All others: 2000 to 4998 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

ELECTRICAL SHEETS

F.o.b. Mill Cents Per Lb	(Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi- Processed	Fully Processed
Field.....	5.00	9.20	
Armature.....	10.35	10.85	
Elect.....	11.00	11.025	11.525
Motor.....	12.05	12.075	12.575
Dynamo.....	13.05	13.05	13.55
Trans. 72.....	14.05	14.05	14.55
Trans. 65.....	14.40		
		Grain Oriented	
Trans. 58.....	15.10	Trans. 80.....	15.50
Trans. 52.....	16.15	Trans. 73.....	19.00

Producing points: Beach Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U3); Warren, O. (R3) (20¢ higher, HR); Zanesville, Butler (A7).

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Casted Nails		Woven Wire Fence		Chain Link Fence Posts		Galv-Barbed and Twisted Barbless Wire		March. Wire Acreld	
	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal
Alabama City R3	167	181	195	187	8.10	8.50	8.475			
Albuquerque, Pa. J3***	164	179	188	17.95	8.475					
Atlanta A8**	166	182	192	190	8.05	8.65				
Bartowville K2**	166	182	192	190	8.05	8.65				
Buffalo W6										
Chicago, Ill. N4**	164	173	188	180	8.10	8.50				
Cleveland A5										
Crawfordsville M4**	166	182	192	190	8.05	8.65				
Duluth A5	164	176	187	184	8.75	9.35				
Fairfield, Oa. T2	164	176	187	184	8.75	9.35				
Grove City S2*	167	181	195	189	8.20	8.60				
Kansas City S2*	169	181	195	189	8.20	8.60				
Minneapolis P6	167	185	191	181	8.10	8.50				
Pittsburg C7	183	199	214	204	8.90	9.30				
Rankin, Pa. A5	164	176	184	17.95	8.35					
Renton C1	166	181	195	187	8.10	8.50				
S. San Franiciso C6	166	182	192	184	8.90	9.30				
Sparrows Pt. B3**	166	181	192	188	8.05	8.65				
Struthers, O. Y1*	170	181	195	187	8.45					
Worcester A5	170	181	195	187	8.25	8.65				
Williamsport, Pa. S5		175								

* Zinc less than .10¢. † Plus zinc extras.

** 13.5¢ zinc.

*** .10¢ zinc.

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD- In.	B.W.- Ga.	C.D.	H.R.	C.D.	
Babcock & Wilcox	2	13	36	34	42	56
	2½	12	48	57	31	44
	3	12	56	51	66	51
	3½	11	65	97	77	60
	4	10	87	61	102	59
National Gube	2	13	36	34	42	56
	2½	12	48	57	31	44
	3	12	56	51	66	51
	3½	11	65	97	77	60
	4	10	87	61	102	59
Pittsburgh Steel	2	13	36	34	42	56
	2½	12	48	57	31	44
	3	12	56	51	66	51
	3½	11	65	97	77	60
	4	10	87	61	102	59

(Effective March 5, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Unheated
Bessemer UI	5.275	6.25	6.60				
So. Chicago R3				9.225			
Enzley T2	5.275	6.25					
Fairfield T2		6.25	9.225		6.275		
Gary U1	5.275					6.275	
Huntington C16		6.00					
Ind. Harbor I3	5.275		6.60	9.225		6.275	
Ind. Harbor Y1				8.775			
Johnstown B3		6.25					
Joliet U1			6.60				
Kansas City S2				9.225		13.85	
Lackawanna B3	5.275	6.25	6.60		6.275		
Lebanon B1						13.85	
Minneapolis C6	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh P5				8.775	12.85		
Pittsburgh J3					8.775		13.10
Seattle B2				9.225		6.425	13.16
Steeltown B3	5.275	6.60			6.275	13.85	
Struthers Y1				8.775			
Torrance C7					6.425		
Williamsport S5		6.15					
Youngstown R3				9.225			

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$15.00 to \$15.75
Foundry, beehive (f.o.b. oven)	
	\$17.50 to \$19.00
Foundry oven coke	
Buffalo, del'd	\$31.75
Detroit, f.o.b.	30.50
N. England, del'd	31.55
Kearney, N. J., f.o.b.	30.00
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.75			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, f.t. allowed in quantity)

Copper	Cast, elliptical, 18 in. or longer,	58.43
	5,000 lb lots	43.28
	Electrodeposited	43.28
Brass	80-20, ball anodes, 2000 lb	54.00
	or more	
Zinc	Ball anodes, 2000 lb lots	21.25
	(for elliptical add 2¢ per lb)	
Nickel	.98 pct plus, rolled carbon,	
	5,000 lb lots	1.0225
	(rolled depolarized add 3¢ per lb)	
Cadmium		1.70
Tin, ball anodes and elliptical	\$1.07 per lb.	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	77.50
Copper sulphate, 100 lb bags, per cwt	26.65
Nickel sulfite, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
	(Philadelphia price 23.30)
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chrome acid, flake type, 1 to 20 100-499 lb drums	31.75

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6"	55	58½	60½	61½
¾" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
¾ in. or smaller	63
5/8 in. to 1 ½ in. inclusive	59½
1 ½ in. to 1 ½ in. inclusive	64
1 ½ in. and larger	58

C. P. Hex reg. & hvy.

¾ in. and smaller	63
7/8 in. to 1 ½ in. inclusive	59½
1 ½ in. and larger	58

(Add 25 pct for broken case or keg quantities)

Hot Galv. Nuts (All Types)

¾ in. and smaller	50
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Semi-finished Hex Nuts

¾ in. or smaller	63
7/8 in. to 1 ½ in. inclusive	59½
1 ½ in. and larger	58

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller	65
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Rivets

	Base per 100 lb
	Pct Off List
½ in. and larger	\$10.86
7/16 in. and smaller	23

Cap Screws

Discount (Packages)
Bright Treated H. C. Heat

New std. hex head, packaged	
½" diam. and smaller x 6"	47
6" and shorter	84
¾", ¾" and 1" diam. x 6"	31
6" and shorter	18
¾" diam. and smaller x longer than 6"	18½
¾", ¾" and 1" diam. & longer than 6"	+ 1
5/16" + 19½	
C-1018 Steel	
Full-Finished Cartons Bulk	
¼" through ¾" dia. x 6" and shorter	47
¾" through 1" dia. x 6" and shorter	31
Minimum quantity—¾" through ¾" diam., 15,000 pieces; 1/16" through ¾" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.	51½

Machine Screws & Stove Bolts

Discount Mach. Stove Screws Bolts

Plain Finish	Quantity	19	54
Bulk			
To ¼" diam.	25,000-200,000	9	54
incl.			
5/16 to ½" diam.	15,000-100,000	9	54
incl.			
All diam. over 3"	5,000-100,000	—	54
long			

Machine Screw & Stove Bolt Nuts

Discount Hex Square

In cartons	Quantity	16	19
In Bulk			
¾" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.1
Chicago	134.1
San Francisco-L. A.	141.5
Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue.	
Source: U. S. Pipe and Foundry Co.	

REFRACTORIES

Fire Clay Brick

Carloads per 1000	
First quality, Ill., Ky., Md., Mo., Ohio, (except Salina, Pa., add \$6.00) \$128.00	
No. 1 Ohio	128.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$2.00)	20.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$140.00
Childs, Hays, Pa.	145.00
Chicago District	150.00
Western Utah	144.00-165.00
California	170.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	150.00-157.00
Silica cement, net ton, bulk, Latrobe	26.00
Silica cement, net ton, bulk, Chicago	24.00
Silica cement, net ton, bulk, Ensley, Ala.	25.50
Silica cement, net ton, bulk, Mt. Union	23.00
Silica cement, net ton, bulk, Utah and Calif.	35.00

Chrome Brick

Per net ton	
Standard chemically bonded, Balt.	
Standards chemically bonded, Curtin, Calif.	\$98.00
Burned, Balt.	108.00
Burned, Balt.	92.00

Magnesite Brick

Standard, Baltimore	\$121.00
Chemically bonded, Baltimore	109.00

Grain Magnesite

St. % to ½-in. grains	
Domestic, f.o.b. Baltimore in bulk.	
Domestic, f.o.b. Chewelah, Wash., Luning, Nev.	\$69.40
In bulk	43.00
In sacks	49.00

(Other ferroalloy prices normally appearing on this page will be published again in the March 14th issue)

FERROALLOY PRICES

(Effective March 5, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd.	67-71%
Cr. 30-100% max. Si.	
0.02% C	41.50
0.03% C	41.00
0.06% C	39.50
0.10% C	39.00
0.15% C	38.75
4.00-4.50% Cr, 67.70% Cr, 1-2% Si	27.75
3.50-5.00% Cr, 57-64% Cr, 2.00-4.50% Si	27.75
0.025% C (Simplex)	34.75
0.10% C, 50-52% Cr, 2% max. Si	35.75
8.50% max. Cr, 50-55% Cr, 3-6% Si	24.00
8.50% C, 50-55% Cr, 3% max. Si	24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.81
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (% thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	
Carloads	\$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.	
Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.	
30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/4 in. x 12 mesh.	
Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 76 pct Mn.

Producing Point Cents per-lb

Marietta, Ashtabula, O.; Alloy, W. Va.; Sheddell, Ala.; Portland, Ore.

Johnstown, Pa.

Sheridan, Kan.

Philo, Ohio

S. Duquesne

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk

Ton lots packed

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RAILWAY EQUIPMENT FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

• SERVICE-TESTED

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline,
Diesel-Electric

SPECIAL OFFERING

6-40-Ton, 40'6"
BOX CARS

Suitable for Intra-plant Service
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Immediate Delivery!

RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon
Cleaned and Tested

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IRON & STEEL PRODUCTS, Inc.

General Office

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Chicago 33, Illinois
Phone: MITCHELL 6-1212

New York Office

50-B Church Street
New York 7, N. Y.
Phone: BEEKMAN 3-8230

"ANYTHING containing IRON
or STEEL"

Sales Slowdown Hits Detroit Area

Business still isn't too bad, but there are many shoppers and few actual buyers.

Reasons given by the dealers are the slow auto market, plus some depression jitters.

Used machinery business in Detroit and Michigan areas continues at a slow rate. Still, some dealers insist that, although business is slow at the present time, it isn't too bad. Sales are still being made but not at the same rapid rate experienced a year ago.

Dealers are somewhat at a loss to explain the slowdown. There isn't any one factor that can be blamed as the principal cause. Market observers are inclined to believe that a combination of events is contributing to the current market sag.

Two Causes Listed—First of all, they say, Detroit is closely allied to the auto industry and the used machinery business often reflects the patterns evident in auto sales. Secondly, talk of the possibility of a depression, no matter how far fetched, has not put prospective customers in a mood to buy.

If anything, small companies are retrenching and cutting their budgets for fear that something serious might happen. Even if this is not the case, some job shops have developed a wait-and-see attitude and postponed any buying.

Tooling Delays—This year, so far, the auto business is not bad but neither is it spectacular. Thus the demand for used machinery and equipment, in the immediate area at least, is also slower than usual.

At the same time, there's more activity on the part of Ford and Chrysler suppliers than from those companies which produce parts for General Motors.

Also, tooling for the 1958 model cars which should have been released by this time, has been held up in a great many cases. It's thought that once the releases are obtained, business will pick up accordingly.

Shopping Around—In the meantime, dealers in Detroit report there are many shoppers but few buyers. This is another way of saying there are a lot of individual inquiries but not very many sales.

The reverse is true in out-of-state areas. Dealers report there are as many inquiries from these areas as there are sales. In some cases, there are even more inquiries.

Tool Room Sales Hot—Regardless of general market conditions, there's still a tremendous market right in Detroit for tool room equipment. This is the only item where dealer inventories are not equal to the demand.

Best sellers in the area right now are late model jig borers, lathes and milling machines. In the production equipment field inventories are a little on the heavy side. This is even true of presses which were such a scarce item only a few months ago.

A Slow Year?—Generally, dealers now feel that 1957 is going to be a slower year than 1956. This is in contrast to the general feeling a little over a month ago.

It's felt that the second quarter will be slower than usual and there won't be much business done during the hot weather in the third.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS

6' x 3/16" Niagara Initial Type
10' x 1/2" Berach Initial Type
10' x 1/2" Kling Pyramid Type
30' x 1/2" Kling Pyramid Type

BRAKES—LEAF
8' x 3/16" Drexel & Krump

BRAKES—PRESS TYPE

12' x 1/16" Cincinnati—NEW

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton B&M 40' Span 230/3/60 A.C.
Floor Control—N.Y. 855

5 ton Whiting 40' Span 230 Volt D.C.
5 ton Shaw 50' Span 230 Volt D.C.
10 ton P&H 38' Span 230 Volt D.C.
10 ton B&M 40' Span 230/3/60 A.C.
15 ton P&H 48' Span 230 Volt D.C.
15 ton Shepard Niles 51' Span 230 Volt D.C.
15 ton P&H 72' Span 230 Volt D.C.
25 ton Cleveland 70' Span 230/3/60 A.C.

With 10 ton Auxiliary

DRAW BENCH 10,000# Acton Standard. Length of Draw 44". Used to draw S.A.E. 1055 Welded Steel Tubing

FORGING MACHINES

1" to 5" Ajax, National

8" to 12" Milwaukee, Air Clutch, NEW 1954

HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING 300 lb. to 20,000 lb.

LEVELER—STRETCHER

100 ton Hydr. Stretcher Leveler. Cap., .032" Ga.
36" Width, 96" Length; 4 Sheets in a Pack

LEVELLERS—ROLLER

87" Torrington, 19 Rolls 1-31/32" Dia. Backed up

45" Acton Standard, 17 Rolls 3/4" Dia.

54" McKay, 17 Rolls, 2% Dia.

108" American, 17 Rolls, 4 1/2" Dia.

PLANER—PLATE EDGE

35" Southward Pneumatic Holdowns, Motor Driven. Capacity 1 1/2"

200 ton Bliss Hydro Dynamic Redraw Press 36"

Narrow Spacing Between Gibs 26"

PRESSES—HYDRAULIC

2800 ton Bliss Hydro Dynamic, 12" Stroke, 60-15/16"

Between Columns

1200 ton United Steam Hydraulic Forging Press

4500 Baldwin-Lima-Hamilton Hyd. Forging Press.

PRESSES—STRAIGHT EDGE

10' 2" 2800 ton, 10" Stroke, Bed 44" x 83"

Clearing F-1300-42, 300 ton, 24" Stroke, Bed 44 x 36"

Cleveland IT-48 Toggle Press 200 ton, 20" x 14" Stroke, 34" Shut Height, Bolster 45" x 48"

PRESSES—TRIMMING

#50 Bliss Cons., 5" Stroke, 26" Ret. Ups

#73/8 Bliss 3" Stroke, 18" Ret. Ups

#76 1/2 Bliss 3" Stroke, 27" Ret. Ups

PUNCH & SHEAR COMBINATIONS

10' 2" 2800 ton, 10" Stroke, Bed 44" x 83"

Cleveland Style G Single End 60" Throat

Cleveland Style W, 60" Throat

No. 1/4 Buffalo Universal Ironworker

ROLLS—FORMING

10' Stand Roll Forming Machine, Shaft 3 1/2" Dia.

Will accommodate 36" wide sheet 16 ga. or up to

3/16" in narrower widths.

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9" Bar Mill

15" Three High Bar Mill

10" x 14" Single Stand Two High

12" x 12" Single Stand Two High

12" x 16" Single Stand Two High

Manufacturing

Confidential Certified Appraisals
Liquidations—Bona Fide Auction Sales Arranged

SELECT MACHINE TOOLS**BORING MACHINES**

3" bar Universal Tri-Way horizontal, table type, (2), one late.

GRINDING MACHINES

72" Hatchett 3-spd. rotary surface, new 1946.
14" x 36" Pratt & Whitney hyd. vert. surface, 1942.
No. 74 Head hyd. pl. Internal X-sliding H. S., 1941.
16" x 36" Landis type C hyd. pl. cylindrical, 1942.

HAMMERS

No. 30 Chambersburg pneumatic, serial No. 2297.
No. 6-1 Hazel, pneumatic, late.
No. 6B Hazel, self-contained.

LATHES

No. 3 Gisholt Univ. Turret Lathe (2), 1942.
No. 5 Gisholt ram type Univ. Turret Lathe, 1940.
15" x 30" Lipe Cinebo-Matic, 1942.
120" x 60" Niles Bement Pond engine lathe, 80 HP, M.D.

MILLING MACHINES

No. 2 Brown & Sharpe vertical mill, new 1943.
No. 5-1 Cincinnati hydromatic duplex mill, serial 3B519191.
No. 2-24 Cincinnati automatic simplex mill, serial No. 183PIT-1.

PRESSES

200 ton No. 7-72 Bliss S.S. D.C. Press Air Clutch.
350 ton Elmes self-cont. 4-past Hydraulic Press, 1944.
500 ton 1939 Hamilton D.C. ad. hed. 60" x 102".
800 ton Model 2E-48-800 Hamilton, S.S. airclutch,
new 1947.
2000 ton No. 6 National Maxipress Forging Press.

SHAPERS & SLOTTERS

32" G & E Invincible, F.M.D.
36 Rockford hyd. vertical slotter, new 1944.

UPSETTERS

1 1/2" National Upsetter, guided ram, hard ways.
3" Ajax upsetting & forging machine, air clutch,
serial 3614.
3" National high duty forging machine, serial 14185.
4" Ajax suspended slides, steel frame.
4" National high duty, susp. & guided ram.
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1000 Tools in Stock

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No. 1/2, No. 1/2 Buffalo Forge Univ. Ironworkers, Coper, Notcher, M.D.

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2" Wallace Hydraulic Pipe Bender

6' Carlton Radial Drill, 17" column

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3-2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress

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2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944

3000 lb. Model J-2 Chambersburg Board Drop Hammer, Motor driven head

1000 lb. Model J-2 Chambersburg Board Drop Hammer, Motor driven head

4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch

Williams White Bulldozers from 5-ton to 300-ton

Landis Landmaco and other Landis Threading Machines

Single & Double End Punches

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20" x 38" Single Stand Two High

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22" x 40" Three High Sheet Mill

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SHEARS—BAR

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10" x 10" Niagara—NEW 1950

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24" Blak & Johnson

36" Wess Slitting Line

36" Paxton Slitting Line

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4" x 11/16" Flat & Edge 1 1/2" x 3/16"

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5/16" A Pen. Capacity 2 1/4" Tube 3 1/4" Solid 18"

Die Length Hydraulic Feed. LATE

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20,000# Baldwin Universal Hydraulic

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100,000# and 300,000 lb Compression

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Eina 1K Welded Tube Mill, Cut-off & Transformer

Cap. 1/4" OD 0.28 wall to 2" OD 1.20 wall

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Watbury Type Straight Roll Tub Type 16 die

Fine Wire Drawing Machine

RE-NU-BILT**GUARANTEED****ELECTRIC POWER EQUIPMENT****DC MOTORS**

Qu. H.P.	Make	Type	Volts	RPM
1 2200	G.E.	MCF	600	400/500
3 1375	G.E.	MCF	415	1200
1 1090	G.E.	MCF	600	350/700
1 940	Whse.	QM	250	140/170
1 800	Whse.	3R	390	250/550

With United Gear Set 7:1 Ratio

Qu. H.P.	Make	Type	Volts	RPM
1 500	Whse.	CC-216	600	300/900
3 450	Whse.	CC-216	550	400/900
2 300	G.E.	MPC	230	400
250	G.E.	MPC	230	600/600
1 200	Whse.	CB-5113	250	400/1200
2 200	Whse.	CB-207.4	250	850/1200
1 150	G.E.	CD B.B.	600	250/700
1 150	Cr Wh.	65-H	230	1150
1 125	Whse.	SK-185	230	330/1050
1 125	Whse.	SK-185	230	850
1 80/100	G.E.	RF-17	230	450/900
2 75	G.E.	53H TEFC	230	850
1 50	G.E.	MD-412-AF	230	550
6 40	Rel.	385F TEFC	230	500/1500
2 30/40	Whse.	RR-131.5-RB	230	500/1500

MG SETS — 3 Ph. 60 Cy.

Qu. KW	Make	Type	DC	AC
1 2000	G.E.	450	250/300	2300/4600
1 2000	G.E.	514	600	2300/4600
1 1500	G.E.	720	600	6000/12000
3 1000	G.E.	720	600	6000/12000
2 1000	G.E.	514	600	6000/12000
1 750	G.E.	720	125/250	2300/4600
1 500	G.E.	900	540/540	4150
1 500	Whse.	900	125/250	440
2 300	G.E.	1200	250	2300
2 300	Whse.	1200	275	440/2300
1 200	Whse.	1200	275	440/2300

TRANSFORMERS

Qu. KVA	Make	Type	Ph.	Voltages
1 3000	A.C.	O1SC	3	33000 x 230
1 1500	G.E.	auto HT	3	400/4200/4400
3 1000	G.E.	HT	1	2400 x 480
1 1000	G.E.	HT	1	13800 x 1400
1 800	G.E.	HT	1	13800 x 1400
3 500	Kohl.	O1SC	1	13200 x 6600
1 500	G.E.	O1SC	1	13200 x 2300
1 500	G.E.	HT	1	13800 x 600
1 300	G.E.	HT	3	4160 x 480/2772
1 200	G.E.	HT	3	13800 x 240/120
1 200	G.E.	HT	3	13800 x 240/120
3 150	G.E.	HT	3	13800 x 240/120

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COMPRESSOR 150# AIR TANK MOUNT BRUNNER SHP

GRINDER CONTINUOUS STRIP MATTISON 444 24"

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 3-MECHANICAL HOT BEDS for bars, 150 ft. and 120 ft. long.
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- No. 72A Heald Gagematic, m.d.
- No. 72A 3 Heald Gagematic, m.d.
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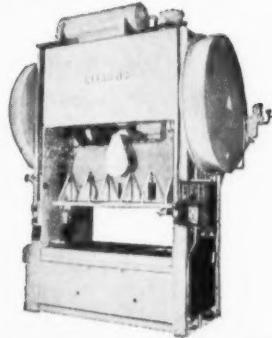
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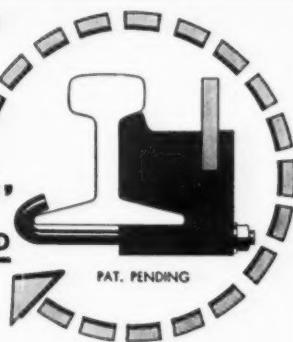
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1	2500	G.E.	3	66,000-Y-2300
3	3000	Al.Ch.	1	28,400-19,200-2300/4160-Y
3	1667	G.E.	1	4800-480
8	1000	Al.Ch.	1	33,000-2300/4000-Y
3	1000	G.E.	1	22,000-2300/4000-Y
5	500	Kuhiman	1	13,860-230/480
3	333	G.E.	1	13,200-230/4000-Y
3	333	Kuhiman	1	13,200-230/480
6	333	G.E.	1	4160/7200-120/240/480
1	300	Whse.	3	11,500-440
4*	225	Whse.	3	2400/4160-250/144
1	150	Kuhiman	1	13,200-120/240
1	100	G.E.	1	4160-120/240

*Dry Type

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5—G.E. cubicle with type FK-235 draw-out 3-P.S.T. magnetic O.C.B., 600 amps., 15,000-volts, 150-A.C.
1—Whse. cubicle with type B-38-BB draw-out 3-P.S.T. magnetic O.C.B., 2,000 amps., 15,000-volts.
Both of these complete with meters, CT's, PT, O.L. Relays and all accessories.
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1—Cubicle with Roller Smith 3-P.S.T., 600 amps., 4160 volt, magnetic O.C.B., type 50 T.C.I., with CT's, PT and relays for O.L. & LV protection.
1—Whse. Distribution Cubicle 92" H. x 108" W. x 46" D., consists of 12 separate compartments each with its door and is manually operated air-breaker type D-50, 600 amps., 600-V., 3-P.S.T., (3) with 3-O.L. relays (9) with 2-O.L. relays, complete all bus and connections.

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Qu.	Make	Type	Amps.	Volts	I.C.	No. of Poles	Operation
1	G.E.	AL-2-75	3,000	600	...	3	Motor
2	In Cubicle with all Accessories	De-Ion 75U22F	600	7,500	...	3	Mag.
6	Whse.	DA-50	800	600	50,000	2	Manual

OUTDOOR OIL CIRCUIT BREAKERS

Qu.	Make	Type	Amps.	Volts	I.C.	No. of Poles	Operation
1	G.E.	FLO-1B	600	15,000	100,000	3	Manual
1	Whse.	FLO-22	400	7,500	30,000	3	Manual
1	Whse.	O-22	400	73,800	125,000	3	Magnetic
1	Whse.	B-20	400	15,000	125,000	3	Magnetic
5	G.E.	FKO-136	400	37,000	125,000	3	Magnetic

OIL CIRCUIT BREAKERS—(Indoor Type)

Qu.	Make	Type	Amps.	Volts	I.C.	No. of Poles	Operation
3	G.E.	FKR-55-28	1,600	15,000	350,000	3	Magnetic
1	Al. Ch.	E-47	800	15,000	50,000	3	Manual
2	Whse.	B-10-8	800	24,000	150,000	3	Magnetic
1	Whse.	B-20-8	600	15,000	150,000	3	Magnetic
1	Whse.	O-25-C	800	7,500	50,000	3	Manual
1	G.E.	FK-143	600	15,000	50,000	3	Magnetic
1	R. Smith	50 T.C.I.	600	4,160	75,000	3	Magnetic
1	G.E.	F.K.-143	600	7,200	50,000	3	Manual

*In cubicle with all accessories

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1-6 ton Cap. Heroult, Side Charge Electric Melting Furnace, 17" electrode complete with all electrical equipment.

1-6 ton Cap. Heroult, Top Charge Electrical Melting Furnace, 17" electrodes, complete with all electrical equipment.

1-6 ton Heroult Side Charge Electric Melting Furnace, with 5000 KVA rebuilt Transformer, 17" electrodes.

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Machines in actual use—Will discontinue department. Available for inspection.

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Geleason 3" Str. Bevel Gear Gens.

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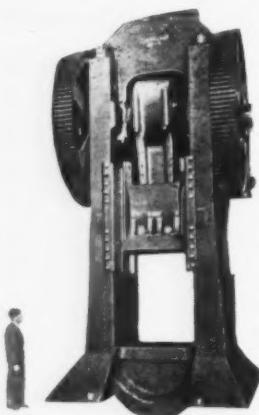
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Fellows No. 4 Gear Shavers.

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1800-2700 ton Cleveland #38E Straight Side Single Crank Press. New '42. Used 2 years. 57 1/4" shutheight, stroke 16", bed area 56" x 56".

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Both machines in excellent condition

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REINFORCING STEEL MAN to locate South Florida with pioneer builders' supply firm with existing Steel Dept. Must be thoroughly experienced in all phases of detailing, estimating, selling and management. Permanent position with many fringe benefits and excellent potential. Send complete resume of age, education, experience and salary expected. Address Box G-501, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

PLANT CONSTRUCTION—Men with construction or steel plant experience for work in Venezuela. Favorable taxes, contracts & profit-sharing. Submit resume, expected salary. All replies held in confidence. Address Box G-500, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

REPRESENTATION WANTED

WANTED

EXCLUSIVE AGENCY

wanted by long-established West Coast dealers in punch-presses and pressroom equipment for a line of roll feeds, dial and other press feeds, as well as fully automatic shearing and slitting lines.

ADDRESS BOX G-499
Care The Iron Age, Chestnut & 56th Sts., Phila. 39

GRAY IRON FOREMAN

Gray Iron jobbing foundry in Midwest has opening for qualified man to take charge of melting and sand conditioning operations. Foundry produces three classes of Gray Iron and pours castings up to 5,000 pounds in weight. Excellent opportunity for person having technical knowledge of metal and sand control apparatus and procedures and who is capable of handling people. In reply furnish complete resume, listing experience, education, age, and salary desired.

ADDRESS BOX G-504
Care The Iron Age, Chestnut & 56th Sts., Phila. 39

CHIEF DRAFTSMAN AND ASSISTANT CHIEF DRAFTSMAN — For Structural Steel Fabrication in good California city, with minimum of ten years experience detailing, checking, scheduling, supervision. Permanent, interesting work for competent, dependable men. Salary \$750.00 and \$600.00 a month to start, plus bonus. Please send resume of experience, education, references. Will consider application through Employment Exchange. Address Box G-502, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

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HIGH GRADE MEN — Salaries \$5,000 to \$25,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Comptrollers, Accountants, and other men of equal calibre have used successfully our confidential service in presenting their qualifications to employers. We handle all negotiations. Submit record with inquiry. The National Business Bourse, 20 W. Jackson Blvd., Chicago 4.

CORE ROOM FOREMAN

Mechanized Gray Iron jobbing foundry located in Midwest has unusual opportunity for qualified man to take complete charge of core making department. Castings range from 20 to 6,000 pounds. Applicant must be experienced in machine tool type castings and be able to handle men. Must have thorough technical knowledge of sand mixes, baking time, and CO₂ process. Submit complete resume of background and experience and state expected salary.

ADDRESS BOX G-503
Care The Iron Age, Chestnut & 56th Sts., Phila. 39

DESIGN ENGINEER

Excellent opportunity for experienced designer of Wire Machinery or Machine Tools. Graduate engineer with several years design experience required. The company is long established and prominent in its field. This is a long term, well paid challenge for the right man. Send resume including education, design experience and salary requirements to Iron Age.

ADDRESS BOX G-505
Care The Iron Age, Chestnut & 56th Sts., Phila. 39

REPRESENTATIVE WANTED

MANUFACTURERS' AGENTS WANTED—Established Steel Foundry producing carbon and low alloy steel in jobbing and production lots is interested in representation in several territories between Chicago and the East Coast. Casting experience preferable. Submit details and other lines now carried. Address Box G-496, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

Detroit Steel Cuts Production

Detroit Steel Corp. announced it is putting ten 100-ton openhearts at its Portsmouth Div., Portsmouth, O., on a standby basis until market conditions warrant reactivation. Four large furnaces and all rolling facilities will continue in operation.

Expansion Continues At Wheeling

Wheeling Steel Corp. is going ahead with plans for a \$35 million capital improvements and expansion program in 1957. Involved are a new high-speed 5-stand cold mill, modern annealing furnaces, a new high-speed 2-stand coil temper mill, and other improvements. They will help boost the company's capacity another 200,000 tons annually.

Chile Gets Export-Import Bank Loan

A \$16 million loan to assist financing the sale of steel mill machinery made in the U. S. for export to Chile was announced by the Export-Import Bank. Receiving the credit is Cia. de Acero del Pacifico, S. A., for diversification of integrated steel operations at Huachipato, Chile. Orders are expected to be placed with 20 primary suppliers in the U. S.

Scrap Export Policy Clarified

To clear up possible misinterpretation of its Feb. 27 statement on export licensing of heavy melting steel scrap, the U. S. Commerce Dept. has issued another statement. The Dept. now says it will consider both old and new applications for licenses.

Rerolling Rail Quota Set

The U. S. Dept. of Commerce on March 4 set the second quarter exports quota for rerolling rails (Schedule B, No. 601170) at 10,000 short tons, of which no more than 5000 tons will be licensed for export to any one country. This is the same tonnage as applied in the first quarter.

No End In Sight For Foreign Aid

A group of businessmen headed by Benjamin F. Fairless advises President Eisenhower that the U. S. must continue to spend about \$8 billion a year on foreign aid for an indefinite period. They warn against wishful thinking that foreign aid can be ended or reduced. Mr. Fairless says we would get more for our foreign aid dollar if parts of the program were converted from an outright gift to a loan basis. He observed that Russia's foreign aid plans are long range.

An asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturer for your copies today.

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KUTZTOWN Skill

creates Hot Top Casings in production-run quantities

By using the machine molding method of casting these Hot Top Casings for ingot molds, Kutztown Foundry was able to hold critical dimensions to within the allowed tolerance—No additional machining was necessary.

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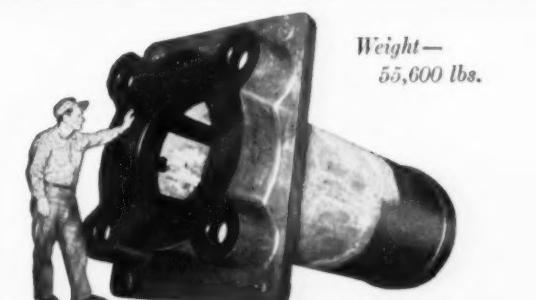


Made of Ductile Iron that resists growth, combats wear and shock and provides the required high strength, Hot Top Casings are being cast by the hundreds at Kutztown. Will you grant us an opportunity to quote you a price on castings in production-run quantities? Machine Molding will save you money!

We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW".

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KUTZTOWN, PENNSYLVANIA



Weight—
55,600 lbs.

PRECISION
GRAY IRON • ALLOY IRON • DUCTILE IRON
CASTINGS

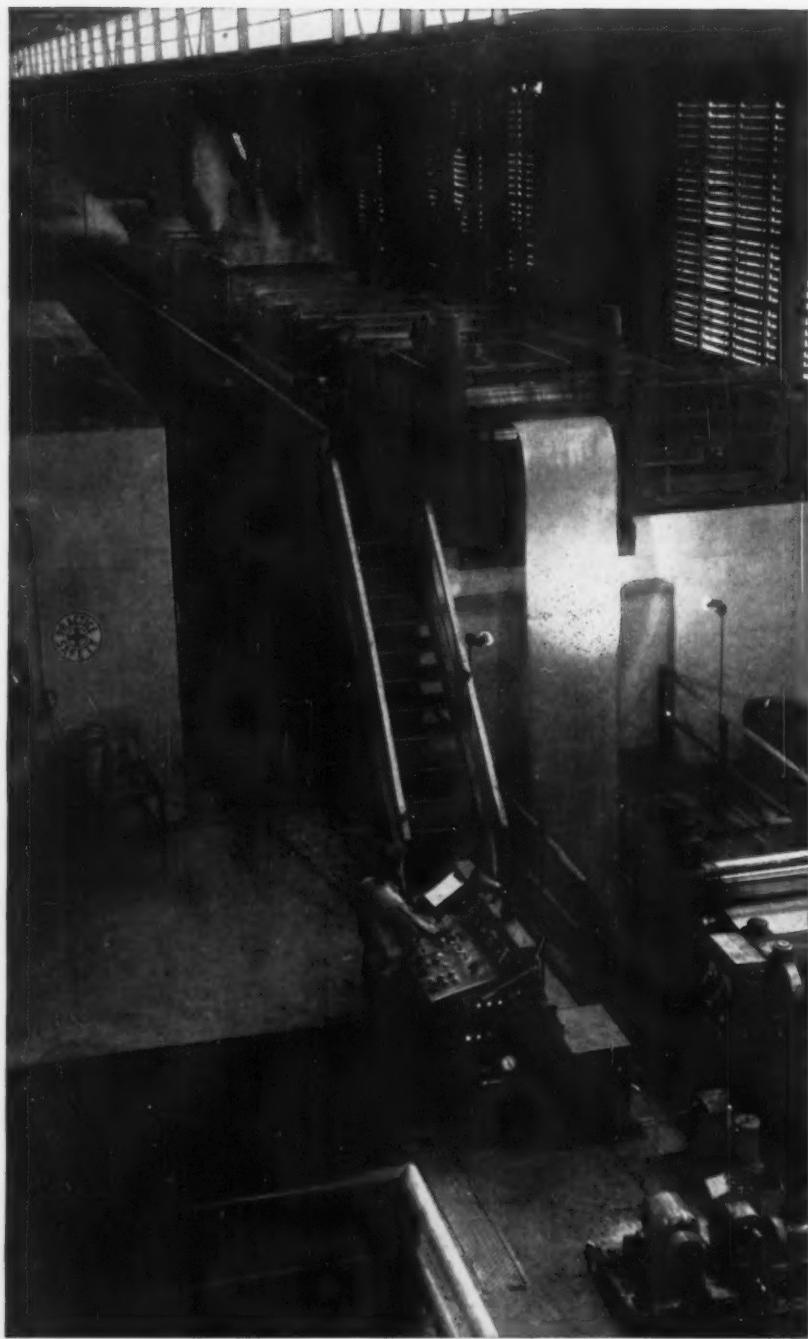
CEMENT BONDED SAND METHOD

**CHAMBERSBURG
ENGINEERING COMPANY**

"THE HAMMER BUILDERS"

B.F.Goodrich report:

Men used to be in danger— giving steel an acid bath



*A typical example of
B.F.Goodrich improvement
in rubber*

THE job of cleaning rust off of long strips of steel used to be slow, costly and plenty dangerous because nothing could hold the hot acid. All kinds of tanks were tried—wood, concrete, steel. Yet acid leaked onto the floor constantly—a waste, a hazard to workmen.

A satisfactory tank seemed impossible until B.F.Goodrich engineers came up with something entirely new in the way of a protective rubber lining. They worked out a combination lining of hard rubber sandwiched between soft rubber, called Triflex, that stands the hot acid. Then they added a brick sheathing to protect the rubber from the slicing, banging of fast-moving steel.

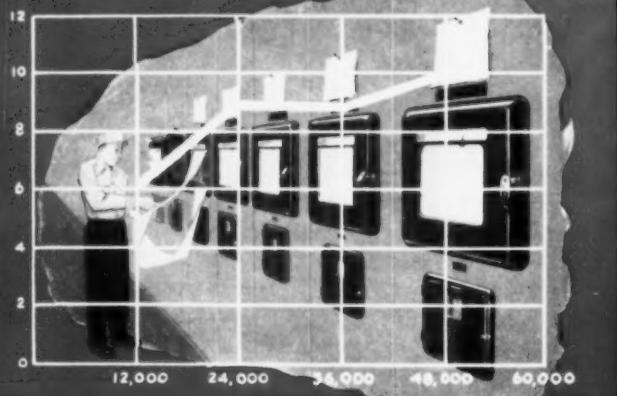
Acid leaks stopped wherever this B.F.Goodrich lining was used. The waste and hazard of messy, acid-wet floors became a thing of the past. At the Kaiser Steel plant pictured here, the B.F. Goodrich rubber-lined tank has been in constant use four years without maintenance expense of any kind. In many plants, linings have been in service 15 or 20 years.

B.F.Goodrich salesmen and distributors have exact specifications for the B.F.Goodrich rubber lining used in this steel mill, as well as information about products featured in hundreds of other B.F.Goodrich success stories. And, as factory-trained specialists in rubber products, these men can answer your questions about all rubber products. *B.F.Goodrich Industrial Products Co., Dept. M-888, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Customer's Report



*"We're getting an average of 9-tons per-man-per-hour
with our Lee Wilson Single Stack Furnaces"*

"Rising labor costs are of constant concern to us, and it's only natural to seek equipment that will make each man more productive," one of our older customers recently related. "It was with this thought that we originally purchased Lee Wilson Single Stack Annealing Furnaces. After two years of exclusive Single Stack operation, we are more convinced than ever that the Single Stack is the most efficient method of annealing yet developed. We're consistently getting as high as nine annealed tons per man per hour on a production of 30 to 35,000 tons per month — the best cost figures we've ever had, or heard of."

Before you place your order for annealing furnaces, make certain you've talked with Lee Wilson engineers about the fastest selling annealing furnace ever built — the Lee Wilson Single Stack.

Only Lee Wilson Furnaces Give You All These Advantages

- 1. GREATER FLEXIBILITY
- 2. MORE UNIFORM HEAT APPLICATION
- 3. IMPROVED CUSTOMER SERVICE
- 4. HIGHER PRODUCTION
- 5. BETTER LOAD FACTOR
- 6. MINIMUM PROCESS INVENTORY
- 7. REDUCED LABOR COST
- 8. BETTER OPERATING CONDITIONS
- 9. LOWER MAINTENANCE COST
- 10. REDUCED INSTALLATION COSTS



* ORIGINATORS AND LEADING PRODUCERS OF SINGLE STACK RADIANT TUBE FURNACES



The trend continues to single stack. Another of the nation's largest steel producers has switched to Lee Wilson Single Stack Furnaces. Shown here is the pilot installation of 6 furnaces and 15 bases.



**design, engineering and craftsmanship
combine versatility with efficiency**



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